MIDWAY

January 1993
16-40023-101-B

NBA JAM™

Operations Manual

- Operation & Adjustments
- Testing & Problem Diagnosis
- Parts Information
- Wiring Diagrams & Schematics

<u>INSTRUCTIONS FOR **NBA JAM**</u>

RED BUTTON - **"SHOOT"** ON OFFENSE; **"BLOCK"** ON DEFENSE

BLUE BUTTON - **"PASS"** ON OFFENSE; **"STEAL"** ON DEFENSE

WHITE BUTTON - **"TURBO":** ENABLES PLAYER TO MOVE **FASTER** AND ENHANCES OTHER ACTIONS. FOR EXAMPLE, RED & WHITE TOGETHER = **DUNK.** TURBO STRENGTH REMAINING IS DISPLAYED ON THE METERS LOCATED AT THE TOP OF THE SCREEN

WHEN PLAYING WITH A COMPUTER CONTROLLED TEAMMATE:
YOUR BUTTONS CONTROL WHEN HE SHOOTS OR PASSES BACK TO YOU.

NBA JAM

TABLE OF CONTENTS

Section 1 - Operation and Troubleshooting
Safety Notices 1-2
Set-Up Procedure
Location Requirements 1-3
Installation & Inspection 1-3
Cabinet Assembly Diagram 1-4
Servicing 1-6
Game Features
Starting-Up 1-8
Player Controls 1-8
Control Panel Diagram 1-9
Game Operation
Control Switches 1-10
Control Switch Location Diagram 1-10
Menu System Operation
Operation 1-11
Main Menu 1-11
Diagnostic Tests 1-12
Switch Test 1-12
DIP Switch Test & Table .... (See Addendum Attached)
CPU & Sound Tests 1-13
Monitor Patterns 1-14
Coin Bookkeeping 1-15
Game Audits 1-16
Game Adjustments 1-18
Standard Pricing Table .... (See Addendum Attached)
Custom Pricing Table 1-20
Utilites 1-21
Troubleshooting 1-22
Notes 1-24

Section 2 - Parts Information
Cabinet Hardware, Speakers 2-2
Manuals, PC Boards, Transformer, Fluorescent Lamp Assy 2-3
Monitor, Control Panel, andCables 2-4
Power Supply Switcher Assembly 2-5
CPU Board 2-6
Sound Board 2-8
Notes 2-10

Section 3 - Schematics and Diagrams
JAMMA Chart 3-2
Sound Board Interboard Wiring 3-2
T-Unit CPU Board Interboard Wiring 3-3
Cabinet Wiring Diagram 3-4
Power Wiring Diagram & Transformer Chart 3-5
Notes 3-6
CPU Board Schematics 3-7
Sound Board Schematics 3-29

NBA JAM

SECTION
ONE

Operation

Safety Notices

The following safety instructions apply to all game operators and service personnel. Specific warnings and cautions will be found throughout this manual where they apply. We recommend that you read this page before preparing your game for play.

⚠CAUTION

AC POWER CONNECTION. Before connecting the game to the AC power source, verify that the "line voltage selection chart" jumper wires are installed correctly for the line voltage in your area. For details, refer to Section 3.

PROPERLY GROUND THE GAME. To avoid electrical shocks, do not plug in the game until it has been inspected and properly grounded. MIDWAY games should only be plugged into a grounded 3-wire outlet. Shocks will also result, if the control panel is not properly grounded! After servicing any parts on the panel, be sure that the ground wires are secure. Only then should you lock up the game.

DISCONNECT POWER DURING REPAIRS. To avoid electrical shock, disconnect the game from the AC power source before removing or repairing any part of the game.

USE THE PROPER FUSE. To avoid electrical shock, use the replacement fuse which is specified in the parts list for this game. The replacement fuse must match the original fuse in fuse type, voltage rating, and current rating.

MONITOR PRECAUTIONS. When removing or repairing the monitor, extra precautions must be taken to avoid electrical shock. High voltages may exist within the monitor circuitry and cathode ray tube (CRT) even after power has been disconnected. Do not touch internal parts of the monitor with your hands or metal objects! Always discharge the CRT by the following method: Attach one end of a large, well-insulated, 20-kv jumper to ground. Momentarily touch the free end of the grounded jumper to the anode by sliding it under the anode cap. Wait two minutes and discharge the anode again.

HANDLE FLUORESCENT TUBE AND CRT WITH CARE. If you drop a fluorescent tube or CRT and it breaks, it will implode! Shattered glass can fly eight feet or more from the implosion.

ATTENTION!

PROPERLY ATTACH ALL CONNECTORS. *Make sure that the connectors on each printed circuit board (PCB) are properly connected. If the connectors do not slip on easily, do not force them. A reversed connector may damage your game and void the warranty. All connectors are keyed to fit specific pins on each board.*

Setup Procedure

Game Location Requirements

Power:	Domestic 115V @ 60 Hz Foreign 230V @ 60 Hz	*Dimensions:*	Width: 37" Depth: 42" Height: 73"
Temp.:	32° F to 100° F (0° C to 38° C)		
Humidity:	Not to exceed 95% relative.	*Weight:*	Approx. 402 Lbs.

Installation And Inspection

1. Remove all items from shipping container and set them aside. Inspect the exterior of the cabinet for any signs of damage. Remove the shipping cleats from the bottom of the cabinet.

2. Remove keys from the taped coin return slot (or attached to Joystick). Unlock and open the coin and cash box doors. (Leg levelers and spare parts are stored in the cash box).

3. Tilt or lay the cabinet down. Locate the four threaded holes on the bottom of the cabinet (one in each corner) and install one leg leveler (with its hex nut) in each hole.

4. Stand the cabinet upright and make certain that it is in a stable position. Level the cabinet.

5. Remove the rear door of the cabinet. Inspect the interior for any signs of damage. Check all major assemblies to assure that they are mounted securely.

6. Refer to the games Cabinet Wiring Diagram (section 3), and check to see that all cable connectors are correctly secured. DO NOT FORCE CONNECTIONS. Watch for damaged connectors and avoid making reversed connections.

7. Install the control panel housing. Follow instruction sheet packed with control panel and housing.

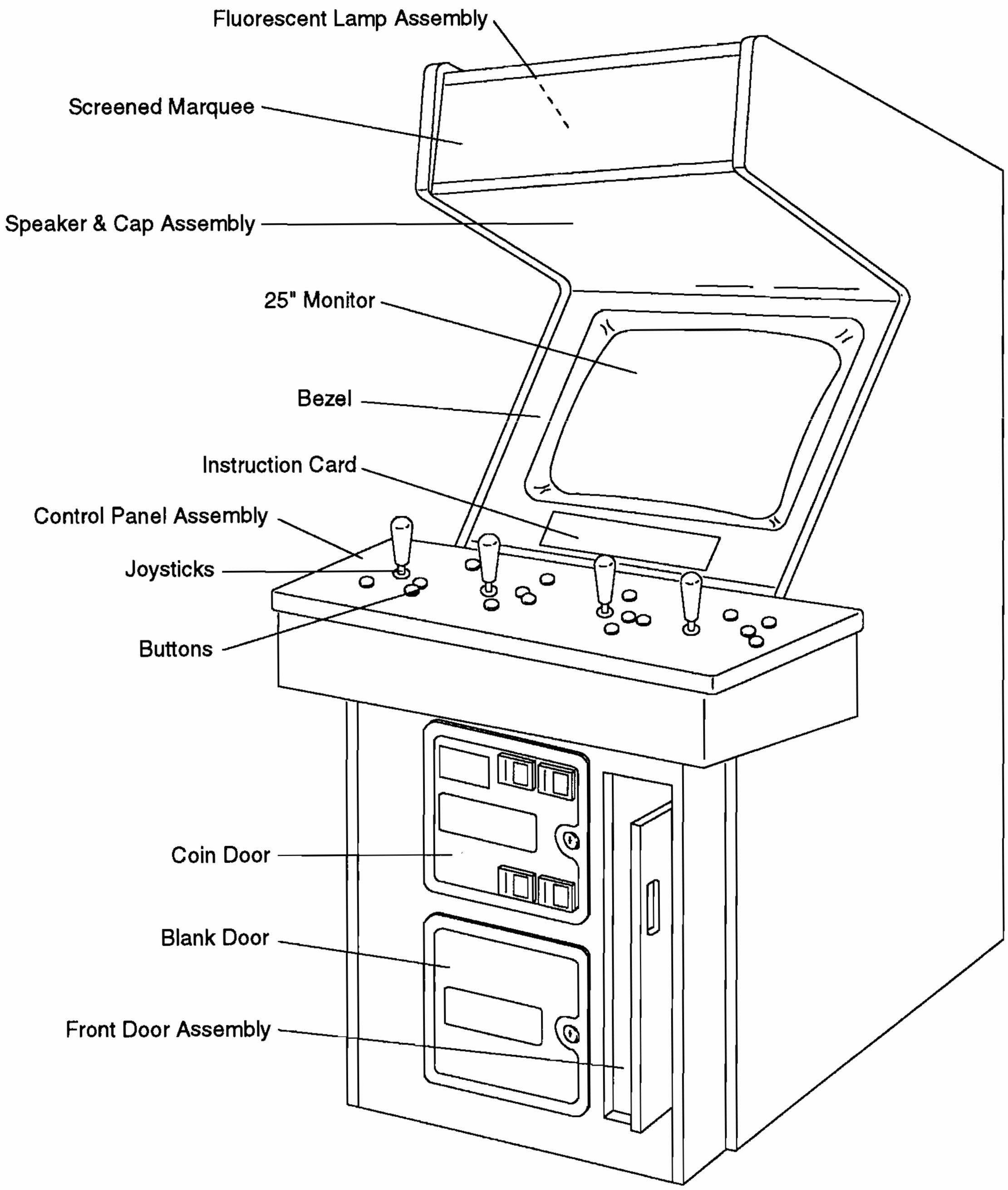
8. Determine the value of your line voltage with a meter. Then, check the power input wires to the main power supply transformer on your game to be sure they are connected to taps which correspond to your local line voltage value. If necessary, reconnect the power input wires to the transformer in accordance with the Transformer Chart in Section 3.

9. Lay the line cord (connected to the Power Chassis) in the slot along the bottom edge of the rear cabinet door. Replace the rear cabinet door and screw (lock) it securely. Close and lock the front coin and cash box doors.

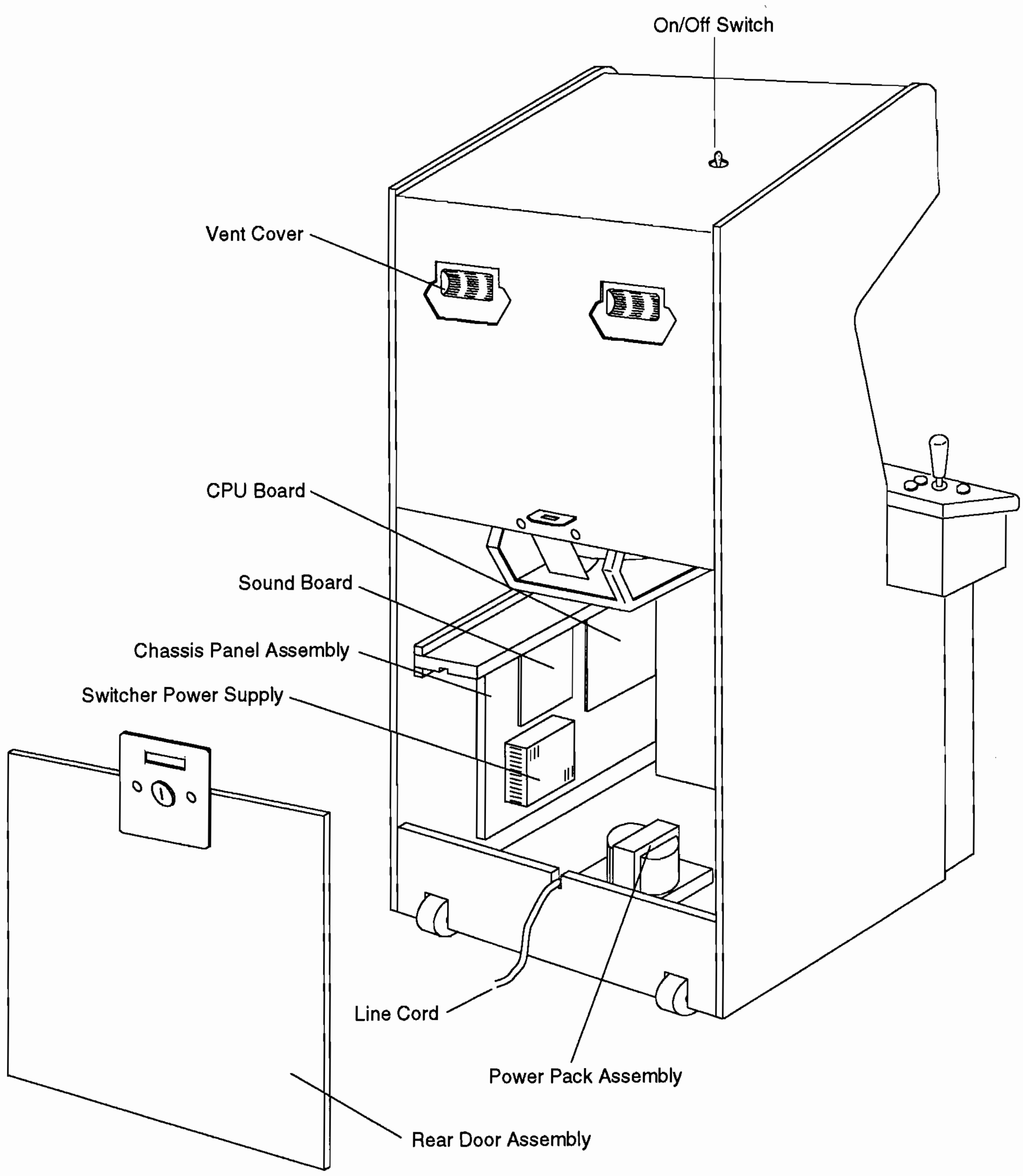
10. Connect the line cord to a grounded (3-terminal) AC wall outlet.

11. Switch ON the game using the ON/OFF switch located on the upper left rear of the cabinet, to verify proper operation.

Cabinet Assembly
(Front View)



Cabinet Assembly
(Rear View)



Servicing

■ Control Panel

Switch OFF power to the game. The control panel is held in place by four latches (located inside the cabinet, on the left and right sides of the control panel) which provide constant pressure on the strikes. The latches can be reached through the coin door opening. To release the latches, lift the latch handle and unhook the wire fasteners. Using the side edges, carefully lift the control panel and tilt it forward until it rests on its support hinges. To reinstall the control panel, check for proper cable connections, including the ground strap. Lower it into position, avoiding pinched wires. Re-clamp the latches.

NOTE

To remove the control panel for bench servicing, reach through the coin door opening and release the latches located on the sides of the control panel. Be careful not to reach straight back through the coin door opening as you might damage the monitors remote controls board. Tilt the control panel until it rests on its support brackets. Disconnect the cables and the ground strap. Lift the control panel out of the game cabinet.

■ Remove Viewing Glass

Switch OFF power to the game and open the control panel (above). Remove the (5) screws holding the lower retaining bracket, and remove bracket. Carefully raise the glass from its bottom grooved edge and lift it clear of cabinet.

■ Remove Monitor Bezel

Switch OFF power to the game and remove the viewing glass (above). Remove the bezel from its grooved edge.

■ Monitor Replacement

We recommend that you read the WARNINGS section thoroughly before beginning this procedure.

Switch OFF power to the game. Remove the viewing glass and the monitor bezel. Completely disconnect the monitor from all of its cabling, including its chassis ground strap.

Remove the four bolts securing the monitors mounting flanges to its mounting panel. Pull the monitor carefully from the cabinet front.

⚠**CAUTION** *While removing the four bolts, firmly support the monitor from the front of the CRT so that it will not slip.*

⚠**CAUTION** *The monitor DOES NOT contain an isolation transformer in its chassis. It is mounted instead in the Power Chassis Assembly locate on the floor of the Cabinet. When servicing the monitor on a test bench, YOU MUST ISOLATE THE MONITOR FROM THE LINE VOLTAGE WITH AN ISOLATION TRANSFORMER.*

■ Remove Marquee Glass

Switch OFF power to the game. Remove the screws in the back plastic strip on top of the cabinet. Remove the strip and carefully lift the glass. Store the glass carefully to prevent damage.

The fluorescent tube is now accessible for replacement. Grasp the tube, give it a quarter turn and remove it from its socket. Carefully place a new tube into the socket and turn to reinstall.

WARNING

If a fluorescent tube drops and it breaks, it will implode!
Use care in handling.

■ Remove Fluorescent Light Assembly

Switch OFF power to the game. Remove the marquee glass (above). Disconnect the fluorescent light assembly from its power cable. Remove the screws fastening the assembly to the cabinet and lift out the assembly.

■ Remove Speakers

Switch OFF power to the game. Remove the tamper resistant screws from the steel speaker screen. Remove the baffle, taking care not to damage the speaker enclosure seals. The speakers pull out from the front of the cabinet. Be sure to disconnect the cabling and remove the nuts on the mounting bolts before attempting to pull the speakers out of their enclosure. The speakers are mounted in an acoustical enclosure, carefully reinstall the seals upon completing any task in the speaker enclosure.

■ Volume Control, Test/Diagnostics Switch, and Service Credit Switch

Open the coin door to locate the games volume control and diagnostic switches on the small panel atop the cash box cover. The Volume Control is the white knob on the left end of the panel. Turning the knob clockwise increases the volume. The upper right switch on the bracket is the Test/Diagnostics Switch that enables activating the games test mode. The lower right switch is the Service Credit Switch, which allows adding credits to a game for service testing without affecting the games bookkeeping total.

Game Features

NBA JAM is a one to four player game.

Starting Up

Switch ON power to the game. A "rug" pattern appears on the CRT screen. When the "rug" pattern ends, the screen shows CHECKING SCRATCH RAMS, and then CHECKING ROMS. The next screen shows NBA JAM REVISION LEVEL, CMOS TEST OK, and the COIN SETTING. The game then moves to the Attract Mode.

Insert the desired amount of coins or tokens. Select which player receives the credit by pressing the appropriate Player Start Button.

NOTE: When an error is detected during Start-up Tests, game start-up does not progress, and an error message appears on the screen.

Player Controls

- **Player Start Button**
  Each start button allows the corresponding player to begin game play.

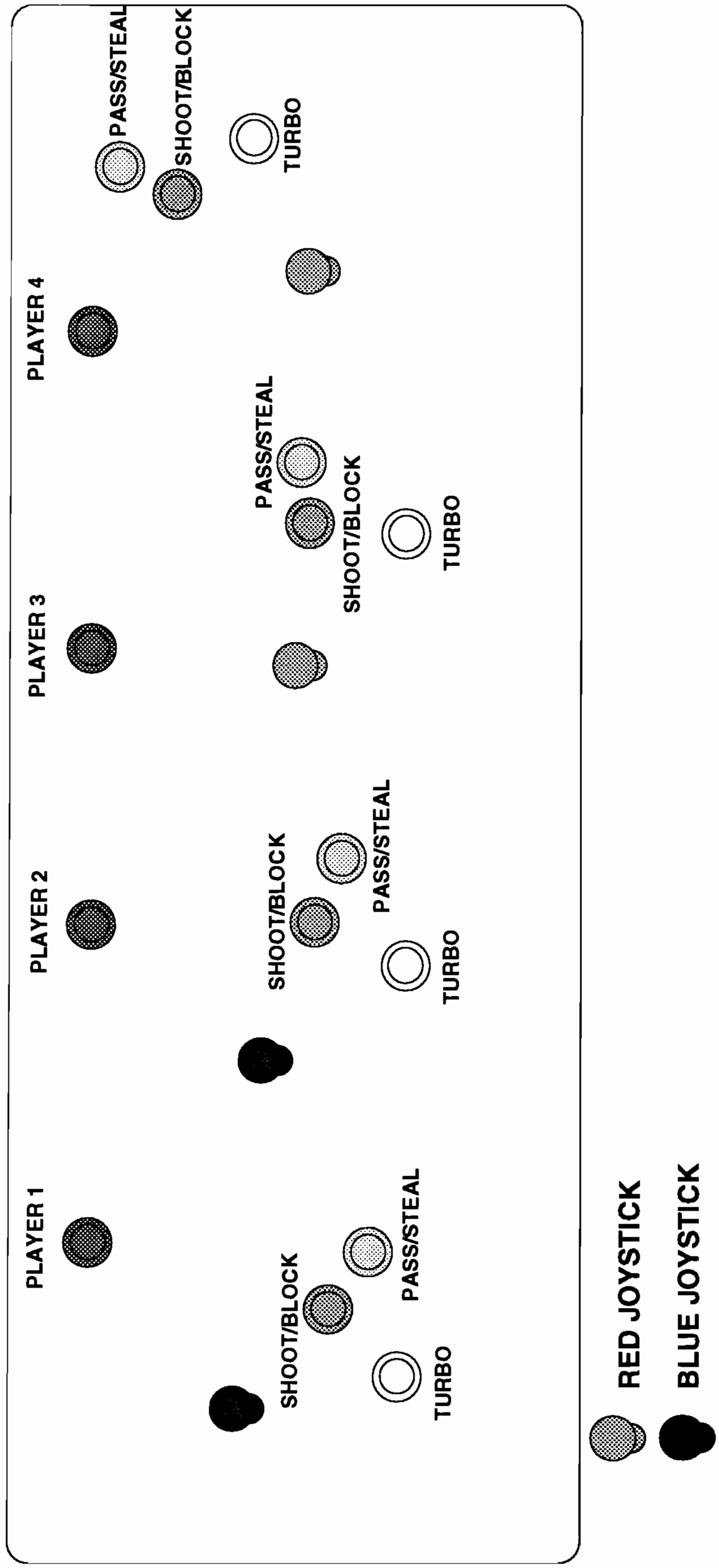
- **Turbo Button**
  The Turbo Button enables players to run faster and it enhances other actions as well (i.e. dunks, faster passes, etc.).

- **Shoot/Block Button**
  The Shoot/Block Button enables players to cause their on-screen player to shoot on offense and jump/block on defense.

- **Pass/Steal Button**
  The Pass/Steal Button enables players to cause their on-screen player to pass on offense and steal on defense.

- **Joystick**
  Each players Joystick controls the eight-way movement of their on screen player.

Control Panel Layout



Game Operation

The NBA Jam Control Switches are located inside the coin door. These switches allow the operator to customize some features of the game.

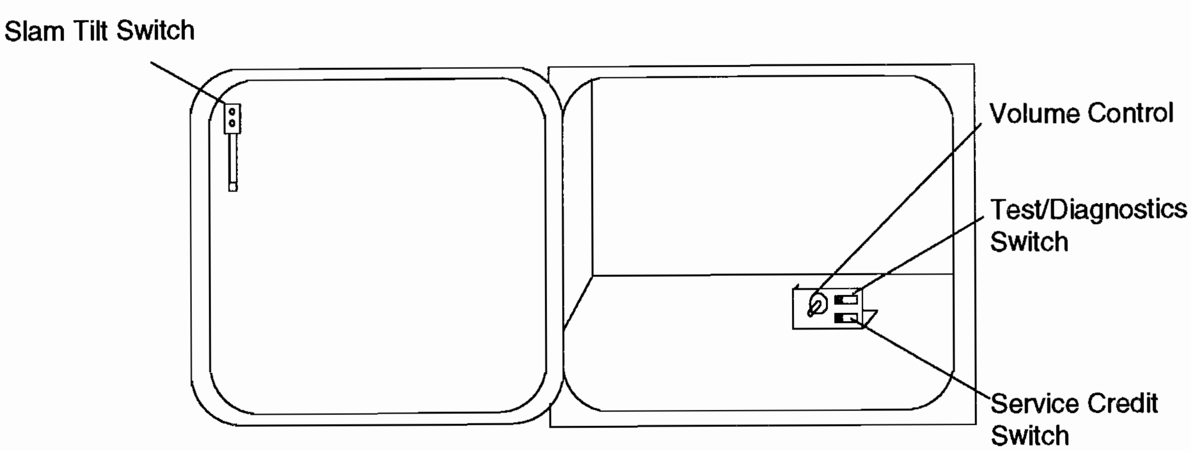
CONTROL SWITCHES

▩ The **COIN DOOR SLAM TILT SWITCH** detects any forceful vibrations against the Coin Door. This eliminates pounding for free games.

▩ The **VOLUME CONTROL** allows increasing or decreasing the volume level of the game music and speech. For greater profits, set your games volume level at its maximum.

▩ The **TEST/DIAGNOSTICS SWITCH** allows you to activate the games Menu System. Move the Test Switch to access the Main Menu. To exit the Menu System, select EXIT TO GAME OVER from the Main Menu, then press any control panel button, or return the Test Switch back to its original position.

▩ The **SERVICE CREDIT SWITCH** is a special feature switch that allots credit without affecting the games bookkeeping total.



Control Switch Locations

Menu System Operation

OPERATION
All NBA Jam Game Audits, Adjustments, and Diagnostics are options of the Main Menu. Each option, in turn, has its own menu, listing several choices that you may act upon as desired.

Move the Test Switch (on the cashbox lid panel) to activate the Main Menu (shown below). Game adjustments, bookkeeping, and diagnostics are all accessible from this menu.

Move any joystick up or down to cycle through the menu options. Notice that the options are highlighted in sequence. Press any button to activate a highlighted option.

Note: Only highlighted options can be activated.

SELECT WITH ANY STICK
ACTIVATE WITH ANY BUTTON

DIAGNOSTIC TESTS

COIN BOOKKEEPING

GAME AUDITS

GAME ADJUSTMENT

UTILITIES

EXIT TO GAME OVER

Main Test Menu

DIAGNOSTIC TESTS

To enter the Diagnostic Tests from the Main Menu, move any joystick to select (highlight) the Diagnostic Test option, and press any control panel button to activate the option.

SELECT WITH ANY STICK
ACTIVATE WITH ANY BUTTON

SWITCH TEST

DIP SWITCH TEST

CPU BOARD TEST

SOUND BOARD TEST

MONITOR PATTERNS

RUN BURN-IN TEST

RETURN TO MAIN MENU

Diagnostic Test Menu

Switch Test

The Switch Test allows the operator to test the switches on the control panel and the coin door.

Select the Switch Test by using any joystick to highlight the Switch Test option; then, press any control panel button to activate it. The top of the screen shows a layout of the control panel and the bottom of the screen lists the coin door switches. Pressing a switch causes the corresponding switch location on the screen to light. Release the switch and the screen returns to normal.

Press the Player 1 & 2 Start Buttons together to return to the Diagnostic Menu.

DIP SWITCH TEST

The DIP Switch Test allows the operator to check the position of the two 8-position DIP switches on the CPU Board. The operator can also change the setting of each position of each DIP Switch during this mode.

To enter the test, use any joystick to select the DIP Switch Test and any control panel button to activate it. The screen displays a layout of their current settings.

To change a DIP Switch setting, move the switch to the desired setting, then check the screen to verify that the switch now shows the new setting.

Press any control panel button to return to the Diagnostic Menu.

DIP Switch 1 Settings Table (UJ1)

	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Coinage								
DIP Switch	Off *							
CMOS	On							
Coin Settings								
USA 1 / Ger 1 / Fr 1		Off *	Off *	Off *				
USA 2 / Ger 2 / Fr 2		On	Off	Off				
USA 3 / Ger 3 / Fr 3		Off	On	Off				
USA 4 / Ger 4 / Fr 4		On	On	Off				
USA ECA / Ger ECA / Fr ECA		Off	Off	On				
N/U / N/U / N/U		On	Off	On				
N/U / N/U / N/U		Off	On	On				
Free Play / Free Play / Free Play		On	On	On				
Country								
USA					Off *	Off *		
German					On	Off		
French					Off	On		
Not Used					On	On		
Coin Counter Mode:								
One Counter - Left							Off *	Off *
Two Counters - Left/Right							On	Off *
One Counter Totalizing - Left							Off *	On
One Counter - Left							On	On

NOTE: In Totalizing, the left counter only, calculates the total coinage intake in multiples of the lowest denomination of coin accepted by the various coin chutes.

DIP Switch 2 Settings Table (UJ2)

	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8
Not Used	Off * On							
Dollar Bill Validator								
Not Installed		Off *						
Installed		On						
Not Used			Off * On					
Not Used				Off * On				
Not Used					Off * On	Off * On	Off * On	
Test Switch								
Game Mode								
Test Mode								

* Indicates Factory Setting

CPU Board Test
The CPU Board Test (much like the Start-up Test) allows the operator to check the RAMs and ROMs.

Select the CPU Board Test with any joystick; then, press any control panel button to activate the automatic test of the CPU Board's RAMs and ROMs. When this test is activated, a "rug" pattern appears on the screen. The screen then changes to show the layout of the RAMs and ROMs on the CPU. Any chip that is shown as black with a white outline is part of the CPU and should turn either red or green during the CPU Test. Any chip that is shown as gray with a white outline is not installed in the game. During the test, chips are good, if they turn green; they are faulty, if they turn red.

Sound Board Test
The Sound Test allows listening to some of the sounds that NBA JAM is capable of producing. This test also emits a tone for each fault that is detected. After completion of this test, the main menu will be automatically returned to the viewing screen.

Monitor Patterns
The Monitor Patterns Test provides a menu for testing the monitor. Select the test with any joystick and activate with any control panel button. Once the Monitor Test is activated, move any joystick to select a Monitor Test option; press any control panel button to activate the option.

SELECT WITH ANY STICK
ACTIVATE WITH ANY BUTTON

RED SCREEN

GREEN SCREEN

BLUE SCREEN

COLOR BARS

CROSSHATCH PATTERNS

BACK TO DIAGNOSTICS MENU

RETURN TO MAIN MENU

Monitor Pattern Menu

The **RED, GREEN,** and **BLUE SCREEN** tests fill the screen with either red, green or blue.
The **COLOR BARS** test fills the screen with several gradated colors to help with red, green and blue level adjustments Each color should appear sharp and clear.
The **CROSSHATCH PATTERNS** test fills the screen with a grid and a series of dots. The grid and the dots should be clear. The dots should appear round.

If any of the Monitor Pattern Tests shows a need for adjustment, use the proper white knobs on the Monitor Board.

Use any joystick to select RETURN TO MAIN MENU or BACK TO DIAGNOSTIC MENU and activate with any control panel button.

Run Burn-in Test
The Burn-in Test continually repeats the CPU Board Test. Move any joystick t select the Burn-in Test; then, press any control panel button to activate the tes When the Burn-in Test detects an error, the test stops and displays an errc message on the screen. Use this test to find intermittent CPU problems.

To exit this test, switch the game OFF then ON again.

COIN BOOKKEEPING

To enter Coin Bookkeeping from the Main Menu, move any joystick to select the Coin Bookkeeping option; then, press any control panel button to activate it.

The Coin Bookkeeping Table records the coinbox totals and game play counters. The left side of the table names the bookkeeping item; the right side shows the number of coins, credits or plays for each item.

To exit Coin Bookkeeping, move any joystick to select RETURN TO MAIN MENU; then, press any control panel button to activate it.

LEFT SLOT COINS	0
RIGHT SLOT COINS	0
PAID CREDITS	0
TOTAL COLLECTION	$0.00
SERVICE CREDITS	0
TOTAL PLAYS	0
PLAYS UNTIL HIGH SCORE RESET	5000

CLEAR COIN COUNTERS
RETURN TO MAIN MENU

Coin Bookkeeping Table

GAME AUDITS

To enter Game Audits from the Main Menu, move any joystick to select the Game Audits option; then, press any control panel button to activate it. To advance to the next (or return to the previous) page of the Game Audit Table, move any joystick to select either "Next Audit Page" or "Previous Audit Page"; then, press any control panel button to change the page.

The Game Audits Table records the game play statistics. The left side of the table names the Audit item; the right side shows the amount of play.

TOTAL GAME UPTIME (Hrs:Mins)	00:00
TOTAL GAME PLAY TIME (Hrs:Mins)	00:00
GAMES STARTED	0
INDIVIDUAL PLAYER STARTS	0
FULL GAMES PURCHASED	0
1 PLAYER PLAY	0
2 PLAYER PLAY	0
3 PLAYER PLAY	0
4 PLAYER PLAY	0
FINISHED 1ST QUARTER	0
FINISHED 2ND QUARTER	0
FINISHED 3RD QUARTER	0
FINISHED 4TH QUARTER	0
GONE TO OVERTIME	0

NEXT AUDIT PAGE
RETURN TO MAIN MENU

Page 1 of Audit Table

GAME AUDITS Continued

AVERAGE SCORE	0
AVERAGE HUMAN SCORE	0
AVERAGE CPU SCORE	0
AVERAGE WINNING SCORE	0
AVERAGE LOSING SCORE	0
CPU VICTORIES	0
GREATEST CPU VICTORY MARGIN	0
GREATEST CPU LOSS MARGIN	0
SCORE DIFFERENTIAL AT DROPOUT	0
DROPOUTS VS CPU	0
DROPOUTS VS HUMAN	0

PRIVIOUS AUDIT PAGE
RETURN TO MAIN MENU

Page 2 of Audit Table

ATLANTA	0	MILWAUDEE	0
BOSTON	0	MINNESOTA	0
CHARLOTTE	0	NEW JERSEY	0
CHICAGO	0	NEW YORK	0
CLEVELAND	0	ORLANDO	0
DALLAS	0	PHILADELPHIA	0
DENVER	0	PHOENIX	0
DETROIT	0	PORTLAND	0
GOLDEN STATE	0	SACRAMENTO	0
HOUSTON	0	SAN ANTONIO	0
INDIANA	0	SEATTLE	0
L.A. CLIPPERS	0	UTAH	0
L.A. LAKERS	0	WASHINGTON	0
MIAMI	0		

RETURN TO MAIN MENU
PREVIOUS AUDIT PAGE

Page 3 of Audit Table

To exit the Game Audit Table, move any joystick to select RETURN TO MAIN MENU; then, press any control panel button to activate your selection.

GAME ADJUSTMENTS

NOTE: Game Adjustments are explained in more detail on the following page.

Move any joystick to select the Game Adjustment option on the Main Menu; then, press any control panel button to activate it.

The Game Adjustments option allows the owner/operator to change the Game Pricing and Game Difficulty.

The Game Adjustments Menu offer several options. Each option has its own menu. Move any joystick to select an option; then, press any control panel button to activate that option. On the next menu screen, move any joystick to select the item you wish to modify; then, press any control panel button to activate that item. The activated item provides a setting choice. Move any joystick to change the current setting value; then, press any control panel button to lock in the new setting value. Moving the joystick up increases the setting value, moving the joystick down decreases the setting value.

SELECT WITH ANY STICK
PRESS A BUTTON TO MODIFY

RETURN TO MAIN MENU
STANDARD PRICING
CUSTOM PRICING
FREE PLAY
COIN COUNTER MODE
GAME DIFFICULTY
GAME TIMER SPEED
CREDITS FOR FULLGAME
4 PLAYER WIN BONUS
ATTRACT-MODE SOUND
RETURN TO MAIN MENU

Game Adjustment Menu

To exit the Adjustments Menu, use any joystick to select RETURN TO MAIN MENU; then, use any control panel button to activate your selection.

Standard Pricing
Standard Pricing allows the operator to choose any of the "Standard" selections for the Standard Pricing Table.

Custom Pricing
Custom Pricing allows the operator to install pricing other than that of the Standard Pricing Table. Custom Pricing also allows the operator to select the amount of credits required to start a game and the amount of credits required to continue a game. This option is adjusted from the Dip Switch Settings.

Coin Counter Mode
This controls the mechanical coin counter mode.

Free Play
This option selects free play. The setting choices for this adjustment are:
-No (factory)
-Yes

Game Difficulty
Game Difficulty allows the operator to select the difficulty level of the game. The settings for the adjustment are:
-Easiest Setting: 1
-Hardest Setting: 5
-Factory Setting: 3

Game Timer Speed
Game Timer allows the operator to control the overall game timer speed. The settings for the adjustment are:
-Slowest Setting: 1
-Fastest Setting: 5
-Factory Setting: 3

Credits for Full Game
Credits for Full Game allows the operator to select the number of credits required to purchase a full game. The settings for the adjustment are:
-Easiest Setting: 4
-Hardest Setting: 16
-Factory Setting: 8

4 Player Win Bonus
Allows the two winners in a four-player game, that was purchased in full by all players at the beginning, to play the next game for free.

Attract-Mode Sounds
Determines whether the game will make sounds in the attract mode. The settings for the adjustment are:
-On
-Off (factory)

Standard Pricing Table

Name	Settings Credit/Coin	Left Chute	Center Chute	Right Chute	Fourth Chute
USA 1	1/25¢ (2 to Start; 2 to Continue)	25¢	$1.00	25¢	
USA 2	1/25¢ (2 to Start; 1 to Continue)	25¢	$1.00	25¢	
USA 3	1/25¢ (1 to Start; 1 to Continue)	25¢	$1.00	25¢	
USA 4	1/50¢, 3/$1.00 (1 to Start; 1 to Continue)	25¢	$1.00	25¢	
USA 5	1/50¢, 4/$1.00 (2 to Start; 1 to Continue)	25¢	$1.00	25¢	
USA 6	1/50¢ (1 to Start; 1 to Continue)	25¢	$1.00	25¢	
USA 7	1/50$, 3/$1.00 (1 to Start; 1 to Continue)	25¢	$1.00	25¢	
USA 8	1/50¢, 4/$1.00 (2 to Start; 2 to Continue)	25¢	$1.00	25¢	
USA ECA	1/25¢, 4/$1.00 (2 to Start; 2 to Continue)	$1.00	.10¢	25$	5¢
German 1	1/1DM, 6/5DM	1 DM		5 DM	
German 2	1/1DM, 7/5DM	1 DM		5 DM	
German 3	1/1DM, 8/5DM	1 DM		5 DM	
German 4	1/1DM, 5/5DM	1 DM		5 DM	
German 5	1/1DM, 6/5DM	1DM		5DM	
German ECA	1/1DM, 2/2DM, 6/5DM	5DM	1DM	2DM	
France 1	2/5F, 5/10F	5 F		10 F	
France 2	2/5F, 4/10F	5 F		10 F	
France 3	1/5F, 3/10F	5 F		10 F	
France 4	1/5F, 2/10F	5 F		10 F	
France 5	2/5F, 5/10F, 11/2 x 10F	5F		10F	
France 6	2/5F, 4/10F, 9/2 x 10F	5F		10F	
France 7	1/5F, 3/10F, 7/2 x 10F	5F		10F	
France 8	1/5F, 2/10F, 5/2 x 10F	5F		10F	
France 9	1/3 x 1F, 2/5F	1F		5F	
France 10	1/2 x 1F, 3/5F	1F		5F	
France 11	1/3 x 1F, 2/5F, 5/2 x 5F	1F		5F	
France 12	1/2 x 1F, 3/5F, 7/2 x 5F	1F		5F	
France ECA	1/3 X 1F, 2/5F, 5/2 X 5F	1F	10F	5F	
Canada	1/2 x 25¢, 3/$1.00	25¢		$1.00	
Swiss 1	1/1F, 6/5F	1F		5F	
Swiss 2	1/1F, 7/5F	1F		5F	
Swiss 3	1/1F, 8/5F	1F		5F	
Italy	1/500 lire	500 lire		500 lire	
UK 1	1/20P, 3/50P	20P		50P	
UK 2	2/20P, 5/50P	20P		50P	
UK ECA	1/20P, 3/50 P, 7/£1.00	£1.00	20P	50P	10P
UK Elec w/CCU	1/30P, 2/50P, 4/£1.00	£1.00		CCU	
Spain 1	1/100 peseta, 6/500 peseta	100 peseta		500 peseta	
Spain 2	1/100 peseta, 5/500 peseta	100 peseta		500 peseta	
Australia 1	1/3 x 20¢, 2/$1.00	20¢		$1.00	
Australia 2	1/5 x 20¢, 1/$1.00	20¢		$1.00	
Japan 1	1/100 yen	100 yen		100 yen	
Japan 2	2/100 yen	100 yen		100 yen	
Austria 1	1/5 schilling, 2/10 schilling	5 schilling		10 schilling	
Austria 2	1/2 x 5 schilling, 3/2 x 10 schilling	5 schilling		10 schilling	
Belgium 1	1/20F	20F		20F	
Belgium 2	3/20F	20F		20F	
Belgium 3	2/20F	20F		20F	
Belgium ECA	1/20F	50F	5F	20F	
Sweden	1/3 x 1 krona, 2/5 krona	1 krona		5 krona	
New Zealand 1	1/3 x 20¢	20¢		20¢	
New Zealand 2	1/2 x 20¢	20¢		20¢	
Netherlands	1/1HFl, 3/2.5HFl	1HFl		2.5HFl	
Finland	1/1 markka	1 markka		1 markka	
Norway	1/2 x 1 krone, 3/5 x 1 krone	1 krone		1 krone	
Denmark	1/2 x 1 krone, 3/5 krone, 7/2 x 5 krone	1 krone		5 krone	
Antillies	1/25¢, 4/1 guilder	25¢		1 guilder	
Hungary	1/2 x 10 forint, 3/2 x 20 forint	10 forint		20 forint	

Custom Pricing

SELECT WITH ANY STICK
PRESS A BUTTON TO MODIFY

RETURN TO ADJUSTMENTS MENU

(1) LEFT CHUTE (1) UNITS

(1) RIGHT CHUTE (2) UNITS

(1) CHUTE (3) UNITS

(1) CHUTE (4) UNITS

(2) UNITS/CREDIT

(3) UNITS/BONUS

(4) MINIMUM UNITS REQUIRED

(5) CREDITS TO START

(6) CREDITS TO CONTINUE

(7) COIN PAGE HELP

(8) SHOW CREDIT FRACTIONS

(9) COINS PER DOLLAR

(10) MAXIMUM CREDITS

(1) Coins inserted accumulate units. This adjustment specifies the number of units given for each coin in the fourth chute (see "units/credit")
(2) This is the number of coin units required to buy one credit.
(3) One bonus credit is awarded after this many coin units have accumulated.
(4) No credits will be awarded until this many coin units have accumulated.
(5) Each player needs this many credits to begin a game.
(6) Each player needs this many credits to continue a game.
(7) Whenever standard pricing is used, a corresponding message is displayed on the credits screen. Setting this to no disables the message.
(8) When set to yes, fractional credits will be seen on the credits screen.
(9) The detailed bookkeeping screen shows total collections based on this many coins per dollar. (Set to zero to disable the display of money totals.)
(10) This is the limit for the credits counter. Additional coins inserted will be lost. Factory setting is 30.

UTILITIES

Move any joystick to select the Utilities option on the Main Menu; then, press any control panel button to activate it.

The Utilities Menu allows the owner/operator to clear the games bookkeeping memory and to install a custom message.

SELECT WITH ANY STICK
ACTIVATE WITH ANY BUTTON

CLEAR CREDITS

CLEAR COIN COUNTERS

CLEAR GAME AUDITS

CLEAR PLAYER RECORDS

RESET HIGH SCORE

DEFAULT ADJUSTMENTS

FULL FACTORY RESTORE

RETURN TO MAIN MENU

Utilities Menu

Move any joystick to select an item from the Utilities Menu; then, press any control panel button to activate that item. After an item has been activated, you are given the option of resetting that item or not. For example:

CLEAR CREDITS?
ARE YOU SURE?

YES
NO

Move any joystick to choose YES or NO; then, press any control panel button to lock your choice and to return to the Utilities Menu.

To exit the Utilities Menu, move any joystick to select RETURN TO MAIN MENU; then, press any control panel button to activate your selection.

Troubleshooting

PROBLEM	POSSIBLE SOLUTION
NO PICTURE OR DISTORTED PICTURE.	Check for faulty video board or monitor. Check for disconnected video signal cable.
TURN GAME ON & NOTHING HAPPENS.	Check line fuse. Check for +5Vdc at pins C, D, 3, and 4 of the JAMMA Connector.
NO SOUND.	Check the speaker and speaker connection to pins L and 10 on the JAMMA Connector. Check volume control setting. Check for +12Vdc at pins F and 6 on the JAMMA Connector. Check interboard wiring from CPU Board to the Sound Board.
NO GENERAL ILLUMINATION.	Check the 1A., S.B. fuse on the floor, left of the front slide out door.
MOVE JOYSTICK, BUT PLAYER DOES NOT MOVE.	Check for open wires between the Joystick and CPU Board. Check for contamination on joystick switch contacts and CPU Board pins. Check for proper ground.
PRESS START BUTTON AND NOTHING HAPPENS.	Check for open wires between the button and CPU Board. Check for contamination on CPU Board pins or the button switch blade contacts. Check for proper ground.
NO CREDIT GIVEN WHEN COINS ARE INSERTED.	Check for contamination on coin switch contacts. Check for an open wire between Coin Switch 1 and pin 16 on the JAMMA Connector or Coin Switch 2 and pin T of the JAMMA Connector.
TOO MANY CREDITS FOR NUMBER OF COINS INSERTED.	Check Game Pricing setting. Check for a Short between pins T & 16 on the JAMMA Connector.
GAME STAYS IN THE TEST MODE.	Check that the Test Switch in the coin door and the Test Switch (Position 8) on DIP Switch 2 are set to Off.

NBA JAM

SECTION
TWO

Parts Information

Cabinet Hardware

Cabinet Assembly	A-16386-40023
Wheel Bracket	01-9359
Caster Wheel	20-9627
Caster Shaft	02-4404
Leg Leveler Plate	01-9155
Leg Adjuster, 3.0"	08-7377
Lock Plate	01-11285
Pad Lock Bracket	01-11286
Key Lock Bracket	01-11287
Front Door Assembly	A-14267
Latch Bracket	01-6994
Bezel & Instruction Card Set	A-15654-1
25" CRT Bezel	03-8497
Instruction Card	31-1750
Coin Door Assembly, USA	A-16368-01
Coin Door, U.S.A.	09-38000-1
Test Switch	A-16378
Coin Door Cable	H-16371
50K Pot	5014-12925-00
Blank Door w/Lock	09-41000
Line Voltage Cable Assembly	H-16029
Glass Retainer Bracket	01-9607
20" Vent Hole Cover	03-7602
Glass Edge Channel	03-8358
CRT Glass	08-7456-10
Marquee Glass	08-7456-4
Marquee Retainer	03-8252-2
TAG Special Wrench	16-9074
Long Arm Key T-20	20-9620
#555 Bulb, 6.3V	24-8768
Marquee	31-1747
Fuse 1 Amp, S.B. 250V	5731-06569-00
Fuse 3 Amp, S.B. 250V	5731-10356-00
Video Cash Box Tub	03-8863
Coin Meter w/Diode 5V	5580-13476-00

Speakers

Speaker & Cap Assembly	A-14968
Speaker Cable	H-15701
Piezo Speaker Cable	H-14922
Speaker Grille	01-11262
6" Speaker, 25W, 4 Ohm	5555-12929-00
4" Speaker, 15W, 4 Ohm	5555-12924-00
Cap. 10µf, non-pol, 50V, 20%	5045-12914-00

Manuals

Monitor Manual	16-3000-103
Instruction Manual	16-40023-101

PC Boards

Chassis Panel Assembly	A-16054
Power Supply Switcher Assy.	A-15202-1
Power Cable	H-15203
Switcher	20-9797
Shield	01-10573
Mounting Bracket	01-10500
Sound Board Assembly	A-14732-40023
CPU Assembly	A-14816-40023

Transformer Assembly

Power Pack Assembly	A-15916
Line Cord Assembly	A-15921
Power Pack Chassis Assy.	A-15915
Power Pack Jumper Cable	H-13265
Line Filter Jumper Cable	H-15922
Transformer Jumper Cable	H-13378
G.I. Jumper Cable	H-15945
Varistor, 130V, 10J	5017-09044-00
Line Filter, 5 Amp	5102-10310-00
Video Transformer	5610-13326-00
Fuse, SB, 1A, 250V	5731-06569-00
Fuse, SB, 3A, 230V	5731-10356-00
Fuse Holder, Panel	5733-12869-00

Fluorescent Lamp Parts

Fluorescent Lamp Assembly, 15W, 60HZ, 120VAC	A-15890
18" Fluorescent Bulb, 15W	24-8809
Fluorescent Housing	01-10871
Fluorescent Lamp Holders	20-9788
Starter Socket	20-9789
Starter	20-8748-1
Ballast 15 & 20W, 60 Cycle	20-8749-8
Fluorescent Lamp Assembly, 15W, 50HZ, 120VAC	A-15890-1
Ballest 15 & 20W, 50 Cycle	20-8749-9

Monitor

Monitor Support Bracket	01-9969
25" Monitor	5675-12787-01

Control Panel

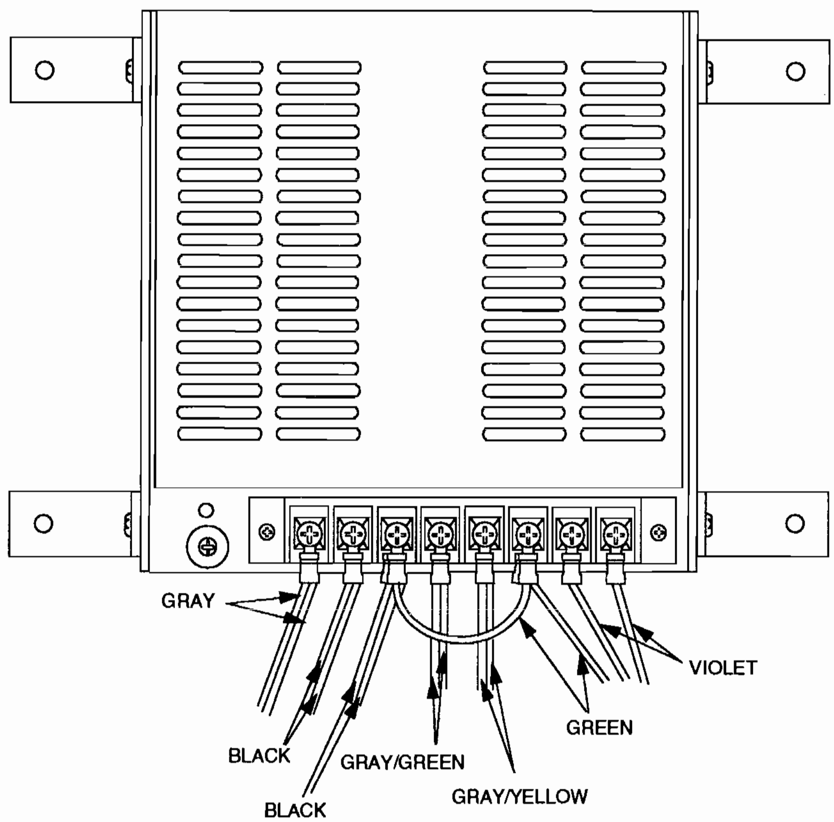
Housing & Control Panel Assembly	A-16159
Control Panel Assembly	A-16160
Wood	11-1107
Plate	A-16485
Control Panel Cable	H-15785
Trunk Bracket (Top)	01-6994
Toggle Latch	20-9347
Red Pushbutton	20-9687-1
White Pushbutton	20-9687-2
Blue Pushbutton	20-9687-3
Orange Pushbutton	20-9687-7
8-Way Red Joystick	20-9694-1
8-Way Blue Joystick	20-9694-3
Screened Overlay	31-1733

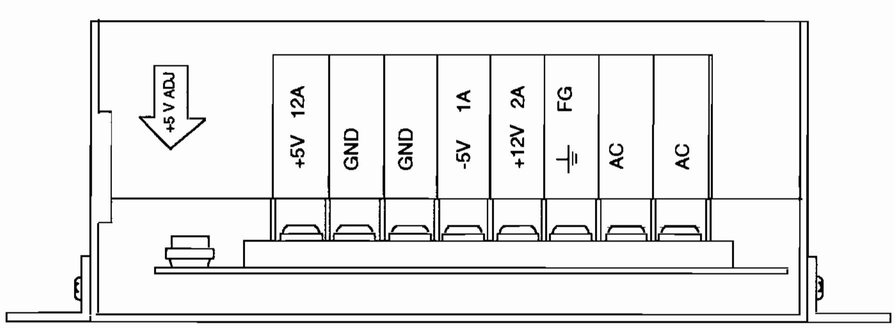
Cables

Power Pack Jumper	H-13265
Transformer Jumper	H-13378
Line Voltage Cable	H-16029
Piezo Speaker Cable	H-14922
Coin Door Cable	H-16371
Video Extension Cable	H-14924
Sound Power Speaker Cable	H-16155
Switch Power Cable	H-15203
Control Panel Cable	H-15785
Main Harness	H-16172
Speaker Cable	H-15701
Line Filter Jumper	H-15922
G.I. Jumper Cable	H-15945
Fluorescent Lamp Cable	H-16303
20-Pin Ribbon Cable	5795-10937-06

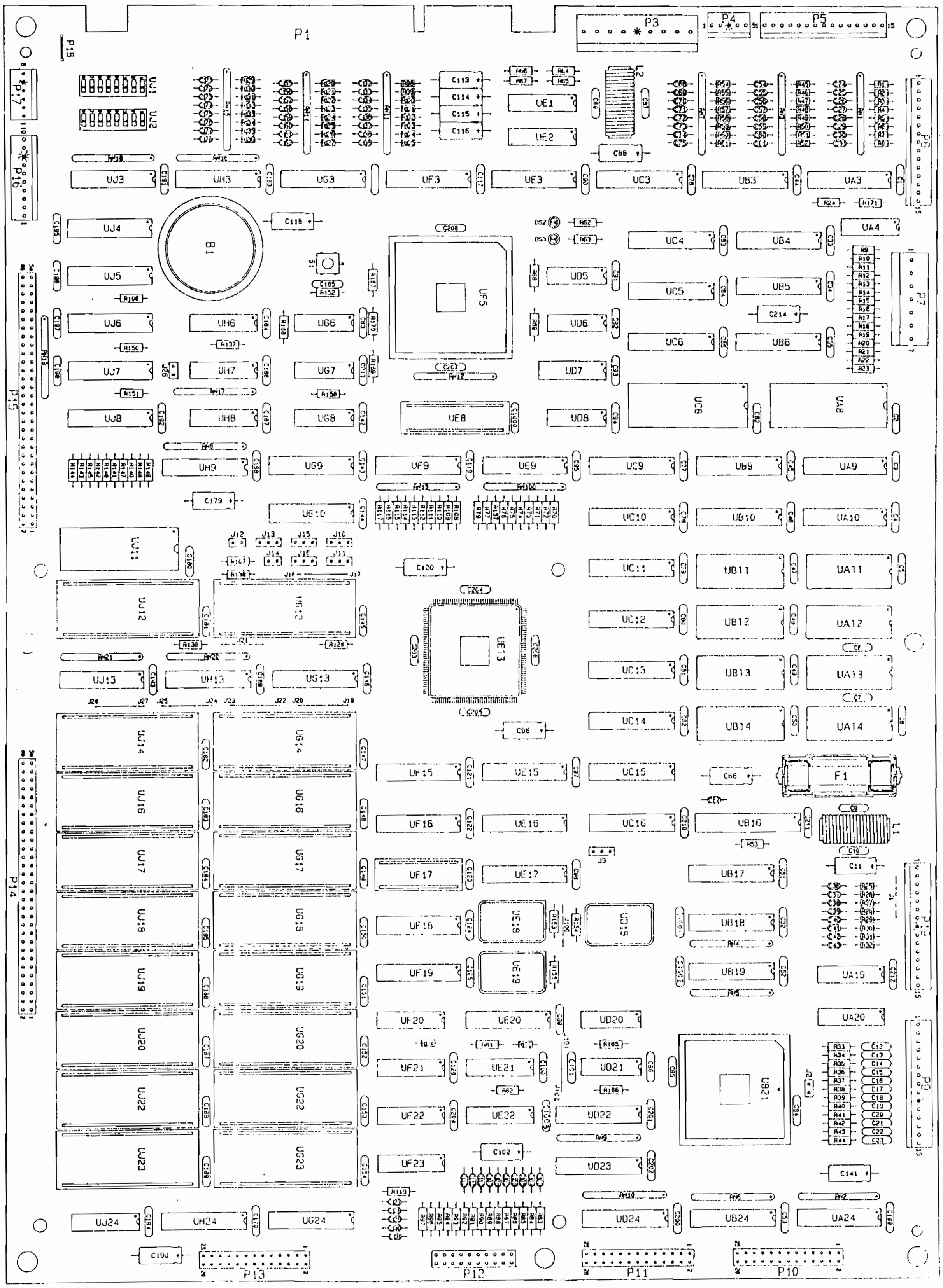
A-15202-1
Power Supply Switcher Assembly

Part Number	Descritption
H-15203	Switch Power Cable
01-10500	Mounting Bracket
01-10573	Shield
20-9797	P/S Switcher Supply





A-14816-40023
CPU Board Assembly



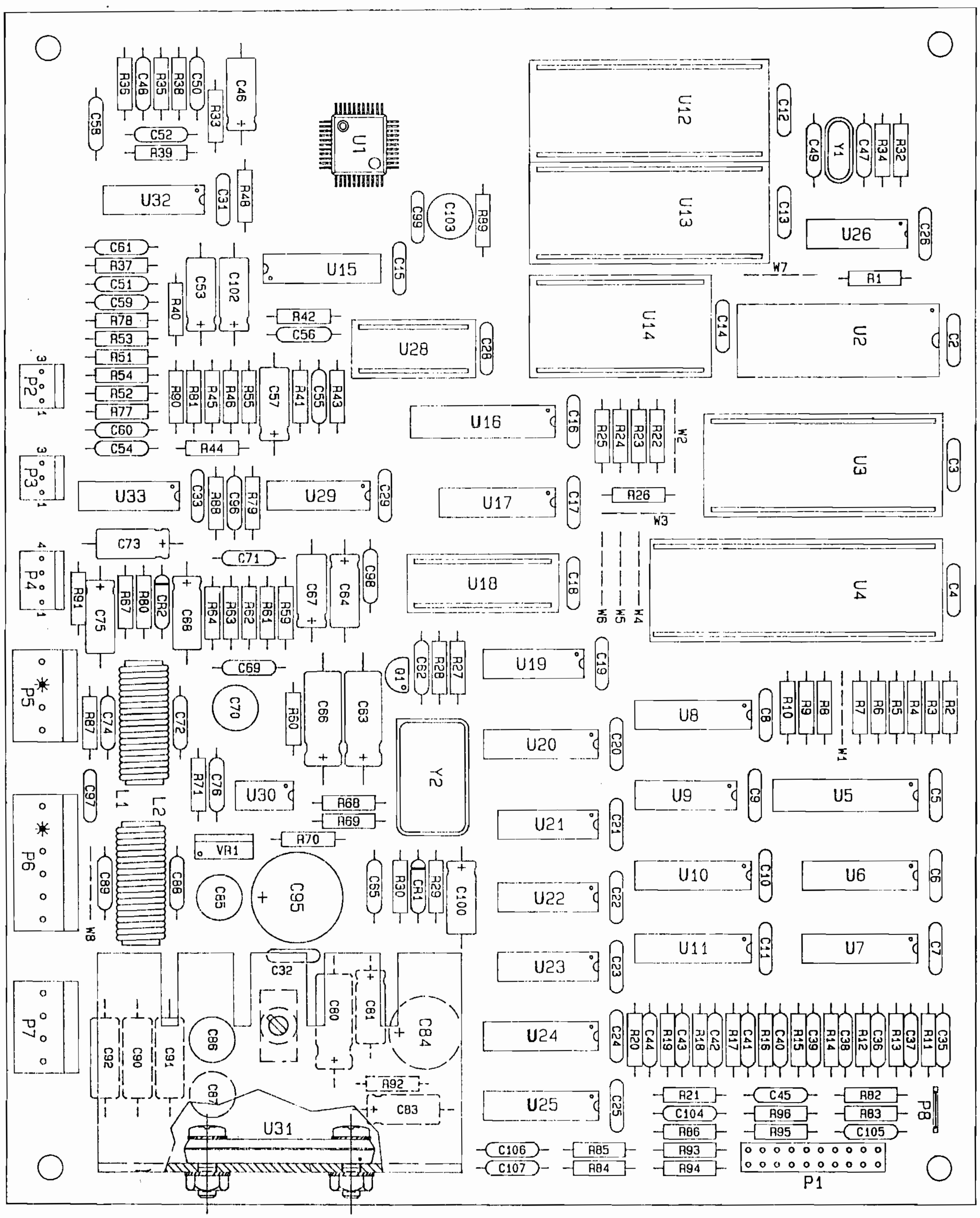
A-14816-40023
CPU Board Parts

Part Number	Part Designator	Description
5372-12901-00	UB16	ADC0848
5434-12255-00	UH6	MAX691
5370-12602-00	UE1	ULN2064
5340-12958-00	UE22, UF22, UF23	26LS31
5340-12959-00	UE21, UF20, UF21	26LS32A
5340-13020-00	UJ4, UJ5, UJ6, UJ7	44C256
5340-12558-00	UJ11	5565
5340-13322-00	UA8, UC8	5C2568
5283-10551-00	UG8	74F00
5283-10552-00	UD6	74F04
5281-09215-00	UD8	74LS04
5280-09309-00	UA4	7407
5283-12488-00	UG6	74F08
5281-09500-00	UD20, UG7	74LS32
5321-13466-00	UD21	74AC74
5281-09737-00	UD5	74LS86
5281-09745-00	UH8	74LS138
5281-13438-00	UH7	74LS155A
5281-09733-00	UE2	74LS174
5320-13437-00	UD22	74ACTQ244
5283-12890-00	UB24, UD23	74F244
5281-09867-00	UG9	74LS244
5320-13436-00	UB18, UB19	74ACTQ245
5283-12889-00	UA24, UD24	74F245
5283-13319-00	UD7	74F253
5283-13320-00	UB9, UF9, UF18, UG10	74F373
5317-12211-00	UB4, UC4	74ALS541
5010-13372-00	R81	220 Ω Res. 5%, 1/8W
5010-13371-00	R62-R67	330 Ω Res. 5%, 1/8W
5040-09343-00	C11, C66, C88, C96, C102, C113-C116, C118, C120, C141, C179, C190, C214	10uF Cap., 20V
5019-09362-00	RN1-RN3, RN6, RN7, RN9-RN12, RN14-RN18, RN100	4.7K Ω Res SIP, 5%, 1/8W
5521-13424-04	UE18	25MHz Oscillator
5521-13424-01	UD18	50MHz Oscillator
5645-09025-00	SW1, SW2	DIP, 8-switch
5317-12208-00	UB6, UC6, UC11, UC12, UC13, UC14, UE15, UE16, UF15, UF16, UH9, UH13, UJ8, UJ13	74ALS245
5010-13363-00	R24, R69, R82-R97, R119, R128, R137, R148, R151, R171	100 Ω Res. 5%, 1/8W
5010-13366-00	R1-R8, R45-R52, R54-R61, R98-R105, R118, R120-R127, R129-R136, R172	470 Ω Res. 5%, 1/8W
5043-08980-00	C1-C4, C9, C10, C32-C35, C44-C46, C51-C53, C62-C65, C76-C86, C90-C95, C97-C101, C117, C119, C121-C126, C140, C142-C154, C163, C164, C166-C170, C180-C189, C191-C194, C199-C213, C1000	.01uF Cap.,
5880-11056-00	B1	Battery, Lithium 3.0V
5400-12220-00	UB21	TMS34010-50
A-16217	UE8	20L8
A-16020	UF5	1020A-1
A-16093	UF17	16L8

Part Number	Part Designator	Description
5010-13369-00	R10, R17, R22	8.2K Ω Res. 5%, 1/8W
5010-13370-00	R9, R18, R23	15K Ω Res. 5%, 1/8W
5048-11030-00	C165	470pF Cap., 10%
5048-11031-00	C87, C89	.001uF Cap., 10%
5671-09019-00	DS2, DS3	LED, Red
5733-12060-01	F1	Fuseholder
5730-12985-00	F1	Fuse, 125V 1.0A FB
5551-09822-00	L2	4.7uH Coil, 3.0A
5881-12315-00	B1	Battery Holder
5700-09915-00	UF17	20 Pin Socket
5700-12047-00	UE8	24 Pin Socket
5700-12253-00	UB21	68 Pin Socket
5700-12424-00	UF5	84 Pin Socket
5791-12461-05	P4	5 Pin Header
5791-12461-06	P17	6 Pin Header
5791-12461-10	P16	10 Pin Header
5791-12461-15	P5, P6	15 Pin Header
5791-10862-07	P7	7 Pin Header
5791-10862-09	P3	9 Pin Header
5791-09437-00	P12	20 Pin Header
5019-09669-00	RN4, RN5, RN13	1K Ω Res. 5%, 1/8W
5010-13472-00	J100, J101	47 Ω Res. 5%, 1/8W
5010-13473-00	R155	39 Ω Res. 5%, 1/8W
5010-13474-00	R158, R167-R170	68 Ω Res. 5%, 1/8W
5010-09534-00	J18, J19, J22, J24, J28, R154	0 Ω Res. Jumper
5010-13362-00	R12, R15, R20	2K Ω Res. 2%, 1/8W
5010-13368-00	R11, R16, R21	3.9K Ω Res. 5%, 1/8W
5281-12887-00	UE9, UH3, UJ3	74LS541
5521-13424-03	UE19	8MHz Oscillator
5048-13375-00	C24-C31, C54-C61, C67-C75, C103-C112, C127-C139, C155-C162, C171-C178	100pF Cap.,10%
5010-13365-00	R53, R107, R138, R139, R152, R157, R165, R166	4.7K Ω Res. 5%, 1/8W
5010-13361-00	R13, R14, R19	1K Ω Res. 2%, 1/8W
5315-13435-00	UA3, UB3, UC3, UE3, UF3, UG3	74HCT541
5010-13364-00	R70-R77, R79, R106, R108-R117, R140-R147, R149, R150	33 Ω Res. 5%, 1/8W
5281-09486-00	UA9, UA10, UB5, UB10, UC5, UC9, UC10, UC15, UC16, UE17, UE20, UF19, UG13	74LS374
5043-08996-00	C5-C8, C47-C50, C195-C198, C1001-C1003	.1uF Cap., 20%
5700-12088-00	UG12, UG14, UG16-UG20, UG22, UG23, UJ12, UJ14, UJ16-UJ20, UJ22, UJ23	32 Pin Socket
A-5343-40023-18	UG12	E PROM
A-5343-40023-1	UG14	E PROM
A-5343-40023-5	UG16	E PROM
A-5343-40023-9	UG17	E PROM
A-5343-40023-13	UG18	E PROM
A-5343-40023-3	UG19	E PROM
A-5343-40023-7	UG20	E PROM
A-5343-40023-11	UG22	E PROM
A-5343-40023-15	UG23	E PROM
A-5343-40023-17	UJ12	E PROM
A-5343-40023-2	UJ14	E PROM
A-5343-40023-6	UJ16	E PROM
A-5343-40023-10	UJ17	E PROM
A-5343-40023-14	UJ18	E PROM
A-5343-40023-4	UJ19	E PROM
A-5343-40023-8	UJ20	E PROM
A-5343-40023-12	UJ22	E PROM
A-5343-40023-16	UJ23	E PROM

Notes: 1. See Section 3 For Schematic; .2 * = Not for individual sale.

A-14732-40023
Sound Board Assembly



A-14732-40023
Sound Board Parts

Part Number	Part Designator	Description
5340-12958-00	U7, U11, U24	IC, 26LS31
5340-12959-00	U6, U10, U25	IC, 26LS32
5281-09850-00	U19	IC, 74LS11
5281-09215-00	U26	IC, 74LS04
5281-09851-00	U21	IC, 74LS14
5281-09487-00	U9, U22, U23	IC, 74LS74
5281-09745-00	U8	IC, 74LS138
5281-09246-00	U20	IC, 74LS139
5281-09733-00	U17	IC, 74LS174
5281-09486-00	U5, U16	IC, 74LS374
5340-12278-00	U2	IC, 2064 Static RAM
5370-12260-00	U30	IC, 3340 Attenuator
5370-12960-00	U29	IC, LM324 OP Amp
5370-12730-00	U32, U33	IC, TL084 OP Amp
5371-12727-00	U15	AD7524 DAC
5370-13308-00	U31	MB3731 Audio Amp.
5521-10931-00	Y2	8Mhz Oscillator
5520-09020-00	Y1	3.58Mhz Crystal
5010-09534-00	W2, W3, W5, W7, W8	0Ω Resistor
5010-09039-00	R89	10Ω Res., 5%, 1/4W
5010-10170-00	R11-R21, R93-R96	47Ω Res., 5%, 1/4W
5010-09036-00	R4, R30, R90	100Ω Res., 5%, 1/4W
5010-09187-00	R27	150Ω Res., 5%, 1/4W
5010-09160-00	R82	220Ω Res., 5%, 1/4W
5010-09416-00	R32, R34, R41, R83	470Ω Res., 5%, 1/4W
5010-09358-00	R43, R68	1KΩ Res., 5%, 1/4W
5010-08998-00	R22-R24, R26, R59, R61	2.2KΩ Res., 5%, 1/4W
5010-08983-00	R28	3.3KΩ Res., 5%, 1/4W
5010-10000-00	R87	3.9KΩ Res., 5%, 1/4W
5010-08991-00	R1-R3, R5-R10, R25, R84-R86, R91	4.7KΩ Res., 5%, 1/4W
5010-09219-00	R69	8.2KΩ Res., 5%, 1/4W
5010-09034-00	R35, R36, R38, R39, R62, R63, R67, R70, R80	10KΩ Res., 5%, 1/4W
5010-09269-00	R64	12KΩ Res., 5%, 1/4W
5010-09324-00	R88	27KΩ Res., 5%, 1/4W
5010-09035-00	R29, R53, R81	47KΩ Res., 5%, 1/4W
5010-10987-00	R77, R78	56KΩ Res., 5%, 1/4W
5010-10650-00	R45, R51	62KΩ Res., 5%, 1/4W
5010-08776-00	R71	68KΩ Res., 5%, 1/4W
5010-13215-00	R54	200Ω Res., 5%, 1/4W
5010-12927-00	R79	82KΩ Res., 5%, 1/4W
5010-09162-00	R33, R48, R55, R60, R92	100KΩ Res., 5%1/4
5010-09134-00	R40, R44, R46, R52	150KΩ Res., 5%, 1/4W
5010-12964-00	R37, R42	820KΩ Res., 5%, 1/4W
5048-11027-00	C59, C60	33pF Cap., 10%
5043-10264-00	C62	68pF Cap., 10%
5043-09492-00	C35-C45, C47, C49, C98, C104-C107	100pF Cap., 10%
5048-12748-00	C54, C61, C96	220pF Cap., 10%
5048-11030-00	C71	470pF Cap., 10%
5048-11031-00	C55, C76	1000pF Cap., 10%
5048-11065-00	C69	2200pF Cap., 10%
5048-11080-00	C52, C58	6800pF Cap., 10%
5048-11072-00	C48, C50, C51, C56	3300pF Cap., 10%

Part Number	Part Designator	Description
5043-08980-00	C2-C26, C28, C29, C31-C33, C97, C99	.01uF Cap.
5045-12926-00	C90-C92	.1uF Cap., 10%
5043-08996-00	C72, C74, C88, C89	.1uF Cap., 20%
5048-12036-00	C65	.22uF Cap., 20%
5040-09365-00	C68	1uF, Cap.,
5040-09343-00	C46, C53, C57, C64, C67, C73, C75, C81 C83, C100, C102	10uF Cap., 20V, 20%
5040-09332-00	C63, C66, C80	47uF Cap., 25V
5040-09421-00	C70, C85-C87, C103	100uF Cap., 25V
5040-09506-00	C84	220u0F Cap., 16V
5040-12314-00	C95	2200uF Cap., 25V
5070-08919-00	CR1	1N4148 Diode
5075-13409-00	CR2	Diode, 1N5232
5160-12891-00	Q1	MPS3646 Trans.
5551-09822-00	L1, L2	4.7uH Inductor, 3A
5371-11087-00	U28	YM 3012 D/A IC
5700-09915-00	U18	20-pin Socket
5370-11086-00	U14	YM 2151 SND GEN IC
5400-10320-00	U4	6809E MPU IC
5700-12088-00	U3, U12, U13	32-pin Socket
5791-10862-04	P5, P7	4-pin Header
5791-10872-06	P6	6-pin Socket
5791-09437-00	P1	20-pin Header
01-10516		Heat Sink
4406-01128-00		6-32 Hex Nut
4006-01003-00		6-32 x 3/8 P-PH-S
20-9690-18		Spacer *Bare PCB
A-5343-40023-19	U3	IC, EPROM Assy
A-5343-40023-20	U12	IC, EPROM Assy
A-5343-40023-21	U13	IC, EPROM Assy
5460-12743-00	VR1	7809
5400-10320-00	U4	68B09E MPU
5371-11087-00	U28	YM3012 D/A CONV
5370-11086-00	U14	YM2151 Sound Gen.
03-8338-1	Mtg. Spacer 1/4"	
A-16422	U18	IC, PLD Sound

Notes: 1. See Section 3 For Schematic; 2. * = Not for individual sale.

Notes...

NBA JAM

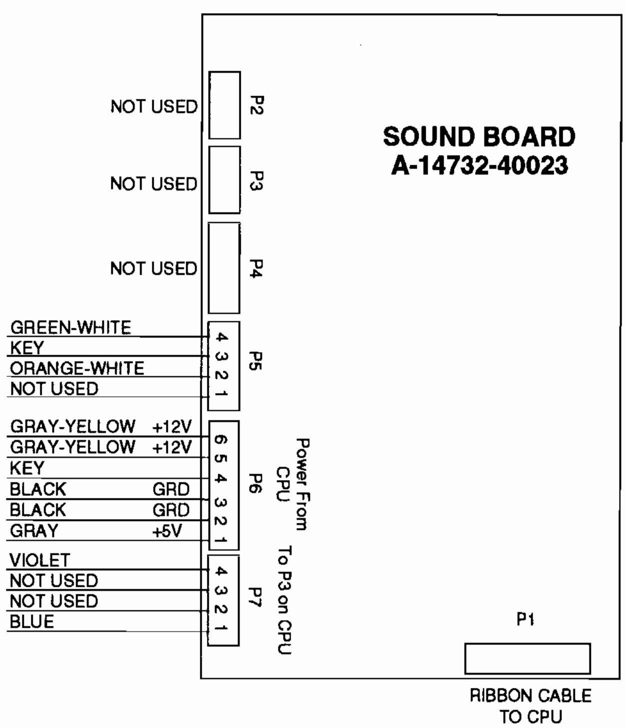
SECTION
THREE

Schematics & Diagrams

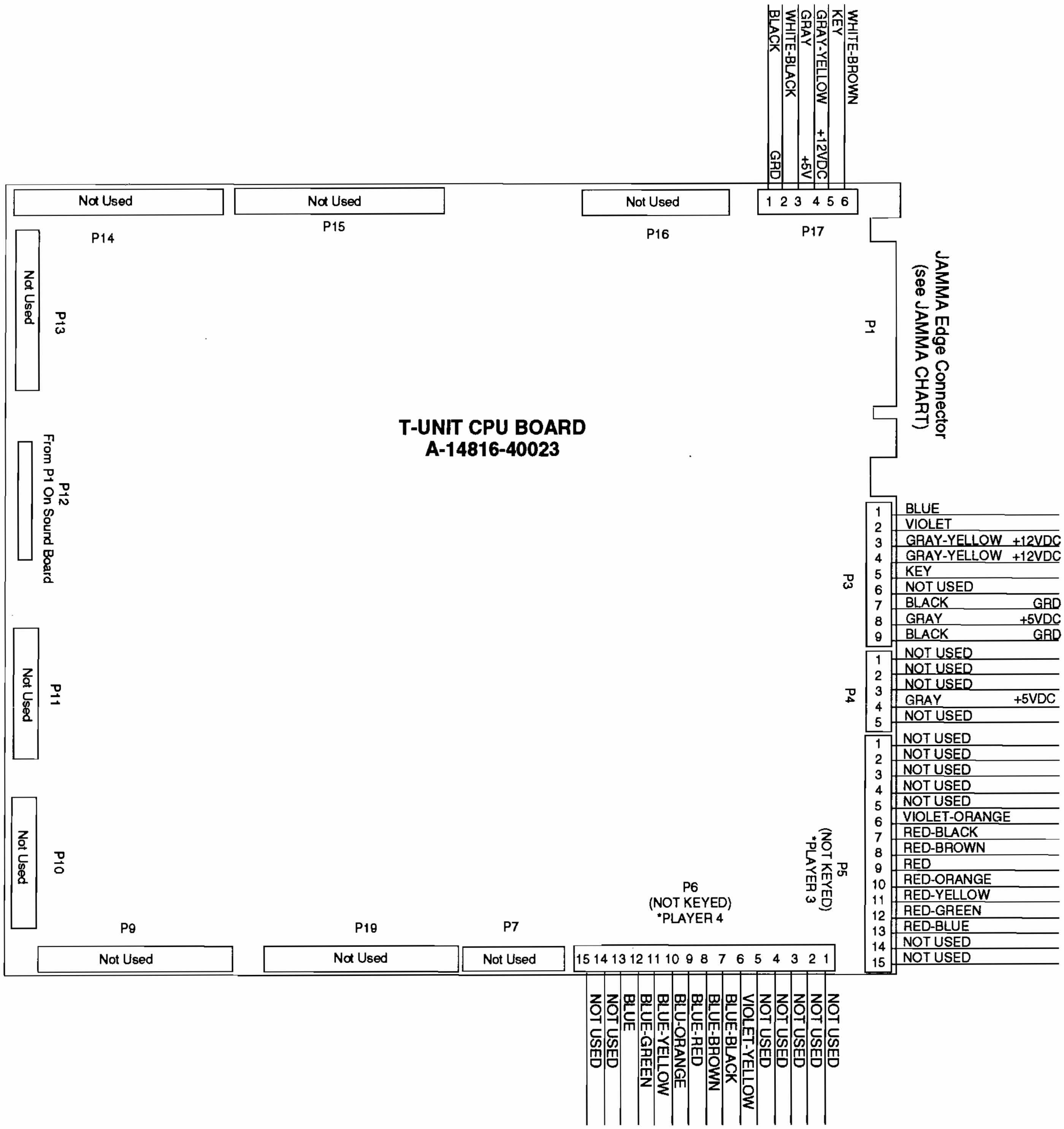
JAMMA CHART

Function	Wire Color	Pin	Pin	Wire Color	Function
Ground	Black	1	A	Black	Ground
Ground	Black	2	B	Black	Ground
+5 Volts DC	Gray	3	C	Gray	+5 Volts DC
+5 Volts DC	Gray	4	D	Gray	+5 Volts DC
-5 Volts DC	Gray-Green	5	E	Gray-Green	-5 Volts DC
+12 Volts DC	Gray-Yellow	6	F	Gray-Yellow	+12 Volts DC
	Key	7	H	Key	
Counter 1	White-Orange	8	J	White-Green	Counter 2
	NC	9	K	NC	
Speaker (+)	Red-Violet	10	L	Green-Violet	Speaker (-)
	NC	11	M	NC	
Video Red	Red	12	N	Green	Video Green
Video Blue	Brown	13	P	White	Video Sync
Video Ground	Shield	14	R	White-Red	Service Credit
Test	Green	15	S	White-Violet	Slam Tilt
1 Coin	White-Blue	16	T	Yellow-White	2 Coin
1 Start	Yellow-Green	17	U	Yellow-Blue	2 Start
1 Up Move	Orange-Black	18	V	Yellow-Black	2 Up Move
1 Down Move	Orange-Brown	19	W	Yellow-Brown	2 Down Move
1 Left Move	Orange-Red	20	X	Yellow-Red	2 Left Move
1 Right Move	Orange	21	Y	Yellow-Orange	2 Right Move
1 Push 1 (Shoot/Block)	Orange-Yellow	22	Z	Yellow-Violet	2 Push 1 (Shoot/Block)
1 Push 2 (Pass/Steal)	Orange-Green	23	a	Yellow-Gray	2 Push 2 (Pass/Steal)
1 Push 3(Turbo)	Orange-Blue	24	b	Violet-Black	2 Push 3 (Turbo)
Not Used	Orange-Violet	25	c	Violet-Brown	Not Used
	NC	26	d	NC	
	NC	27	e	NC	
Ground	Black	28	f	Black	Ground

INTERBOARD WIRING

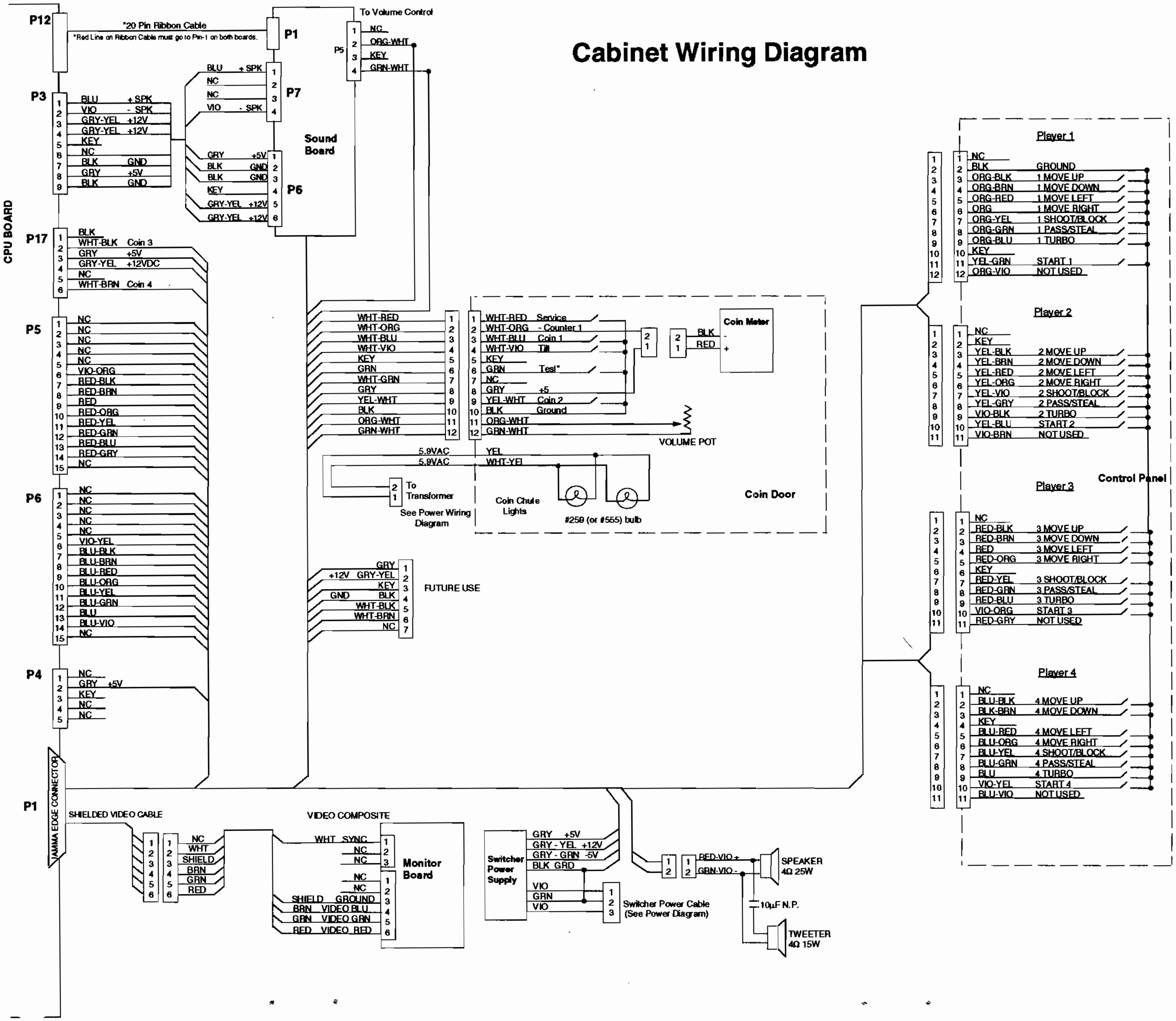


INTERBOARD WIRING

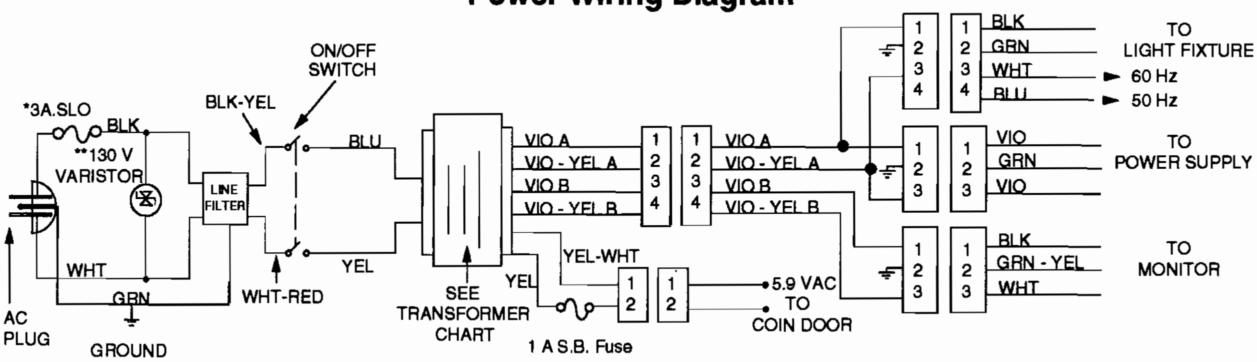


*Cable Connectors are marked Player 3 and Player 4 for installation purposes.

Cabinet Wiring Diagram



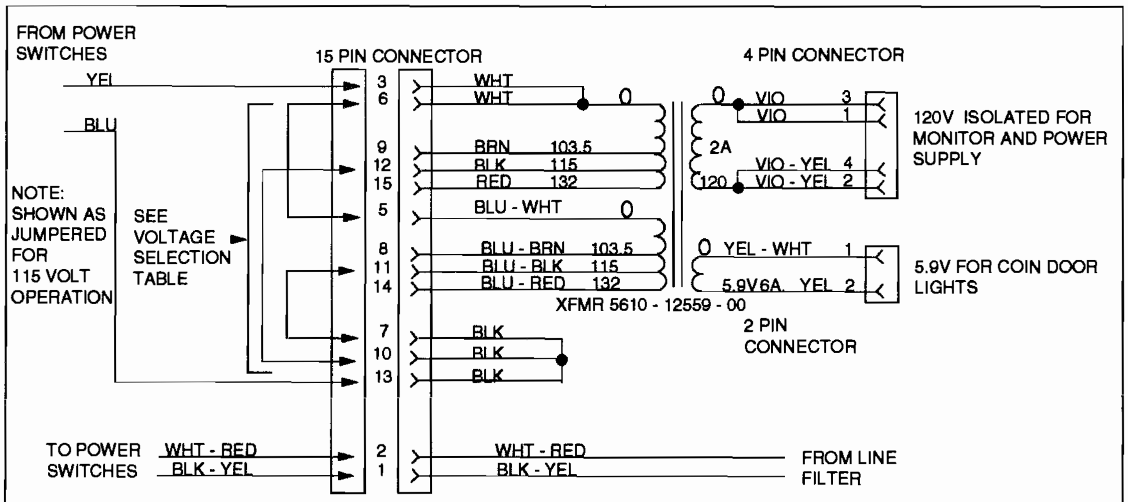
Power Wiring Diagram



*For 250V operation, use 2 Amp fuse.
**For 250V operation, use 250V varistor.

Note
For 60HZ Operation, insert Vio-Yel wire into Pin 3.
For 50HZ Operation, insert Vio-Yel wire into Pin 4.

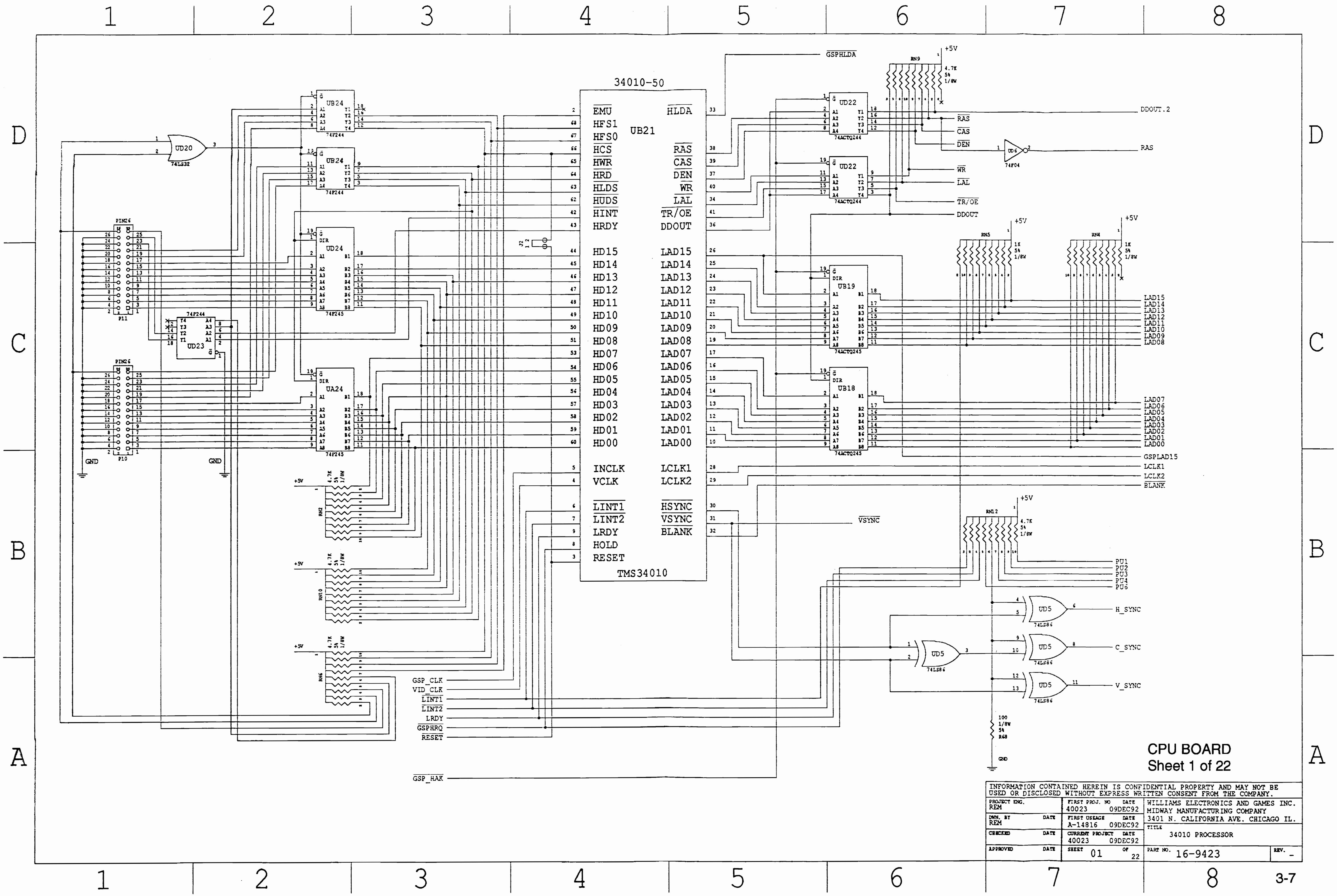
Transformer Chart

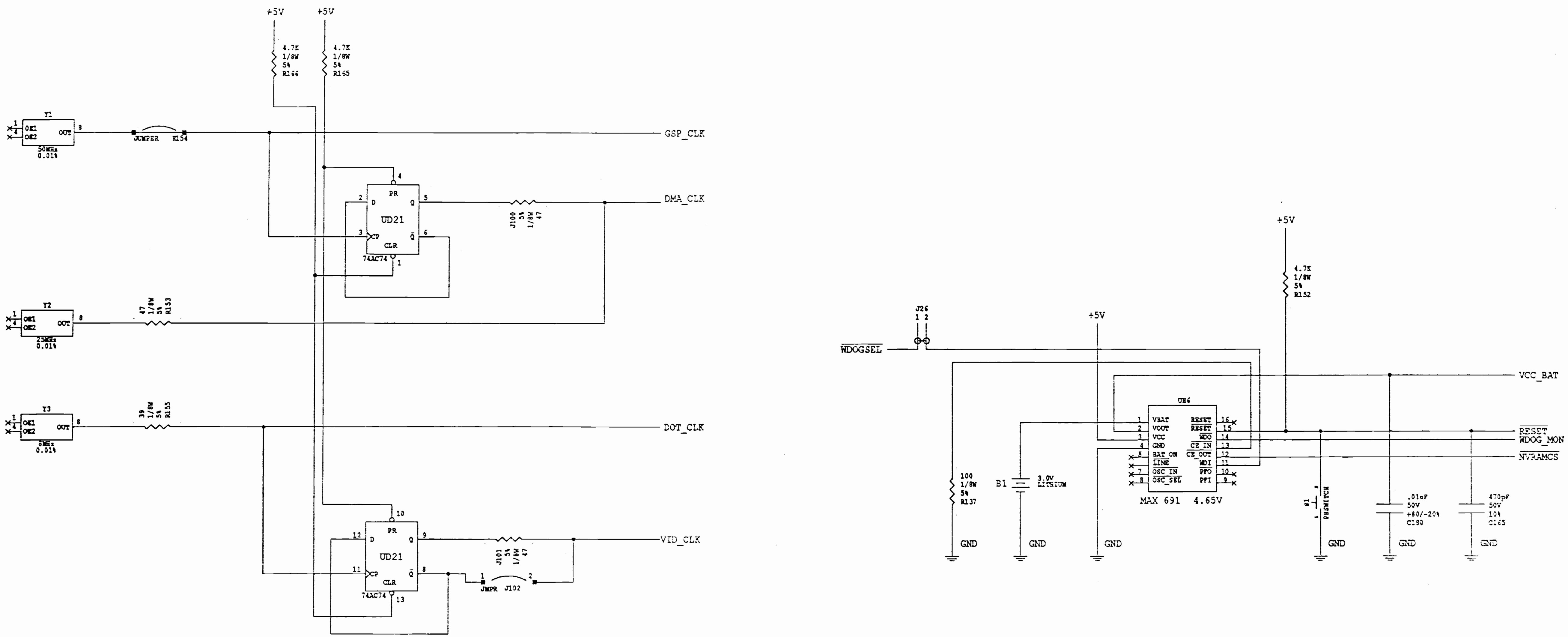


Voltage Selection Table

VOLTAGE	JUMPER PINS
103.5	5 - 6, 7 -8, 10 - 9
115	5 - 6, 7 - 11, 10 - 12
132	5 - 6, 7 - 14, 10 - 15
207	5 - 9, 10 - 8
218.5	5 - 9, 10 - 11
230	5 -12, 10 -11
247	5 - 12, 10 -14

Notes...

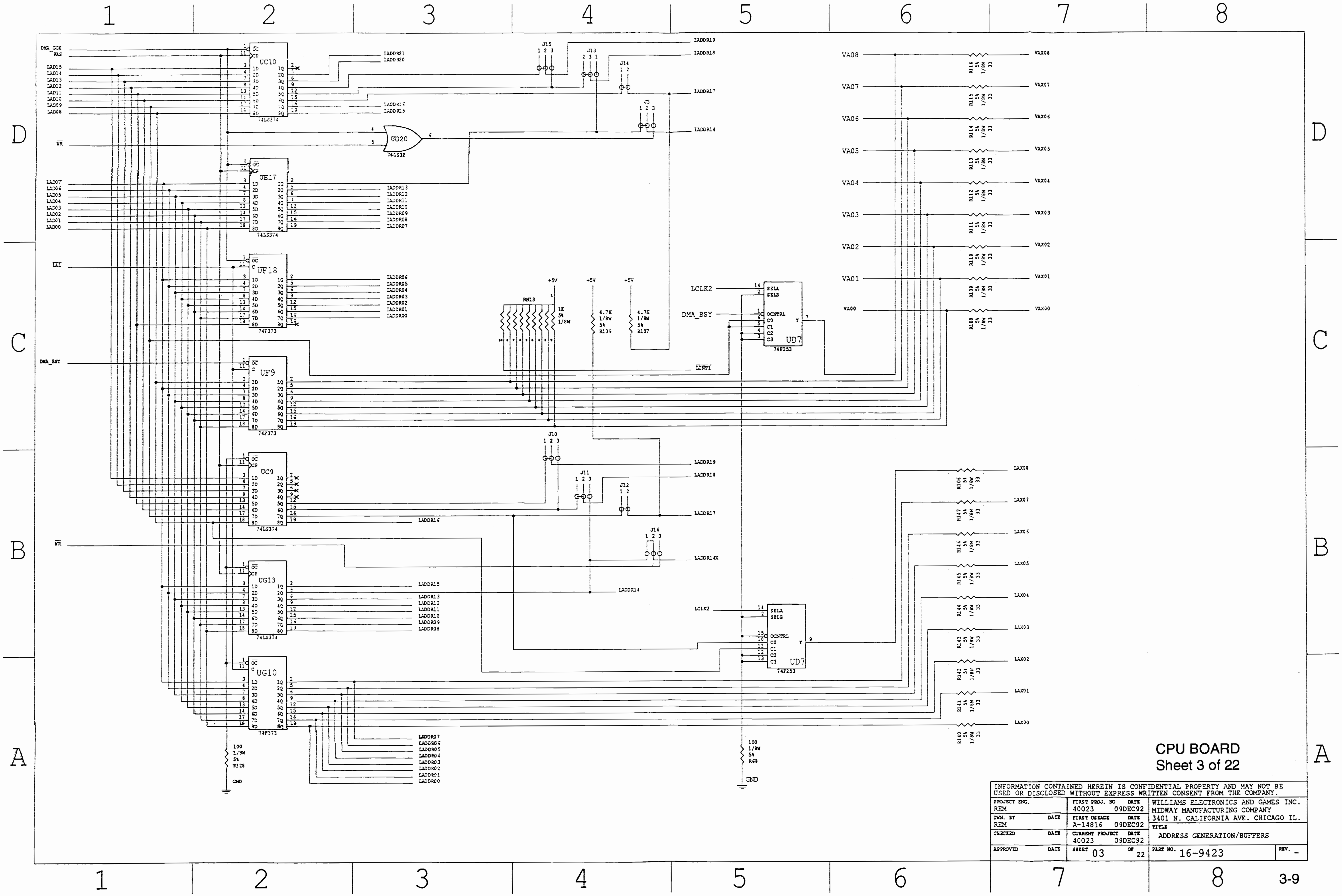

34010-50
UB21
TMS34010
EMU
HFS1
HFS0
HCS
HWR
HRD
HLDS
HUDS
HINT
HRDY
HD15
HD14
HD13
HD12
HD11
HD10
HD09
HD08
HD07
HD06
HD05
HD04
HD03
HD02
HD01
HD00
INCLK
VCLK
LINT1
LINT2
LRDY
HOLD
RESET
HLDA
RAS
CAS
DEN
WR
LAL
TR/OE
DDOUT
LAD15
LAD14
LAD13
LAD12
LAD11
LAD10
LAD09
LAD08
LAD07
LAD06
LAD05
LAD04
LAD03
LAD02
LAD01
LAD00
LCLK1
LCLK2
HSYNC
VSYNC
BLANK
GSPHLDA
DDOUT.2
GSPLAD15
H_SYNC
C_SYNC
V_SYNC
PU1
PU2
PU3
PU4
PU6
GSP_CLK
VID_CLK
LINT1
LINT2
LRDY
GSPHRQ
RESET
GSP_HAK
UD20
74LS32
UB24
74F244
UD24
UA24
74F245
UD23
UD22
74ACTQ244
UB19
UB18
74ACTQ245
UD6
74F04
UD5
74LS86
RN9
RN5
RN4
RN12
RN2
RN10
RN6
+5V
GND
P11
P10
PIN26
J2
CPU BOARD
Sheet 1 of 22
INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.
PROJECT ENG. REM
DWN. BY REM
CHECKED
APPROVED
FIRST PROJ. NO 40023 DATE 09DEC92
FIRST USEAGE A-14816 DATE 09DEC92
CURRENT PROJECT 40023 DATE 09DEC92
SHEET 01 OF 22
WILLIAMS ELECTRONICS AND GAMES INC.
MIDWAY MANUFACTURING COMPANY
3401 N. CALIFORNIA AVE. CHICAGO IL.
TITLE 34010 PROCESSOR
PART NO. 16-9423
REV. -



CPU BOARD
Sheet 2 of 22

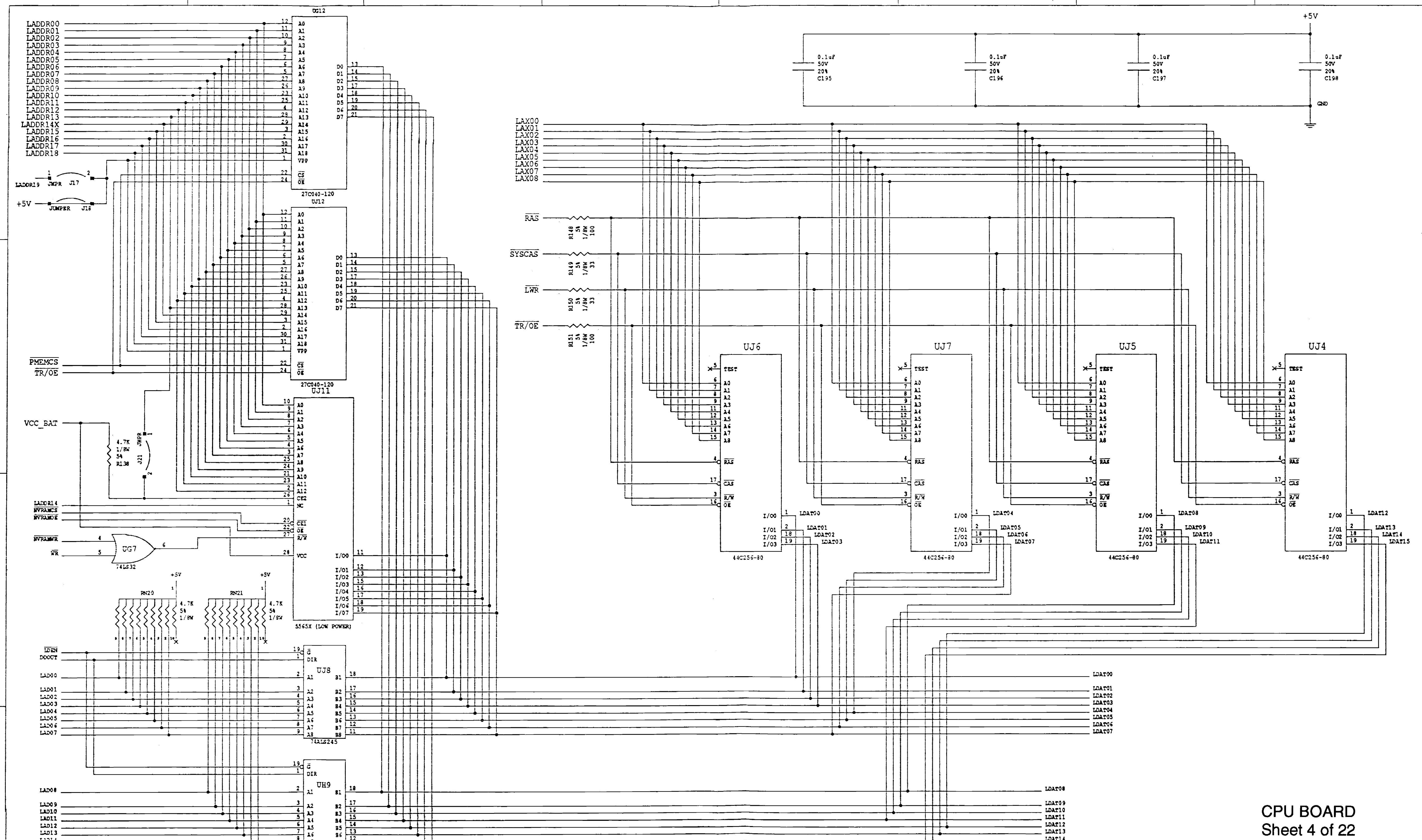
INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	TITLE CLOCK GENERATION/POWER MONITOR
APPROVED DATE	SHEET 02 OF 22	PART NO. 16-9423 REV. -



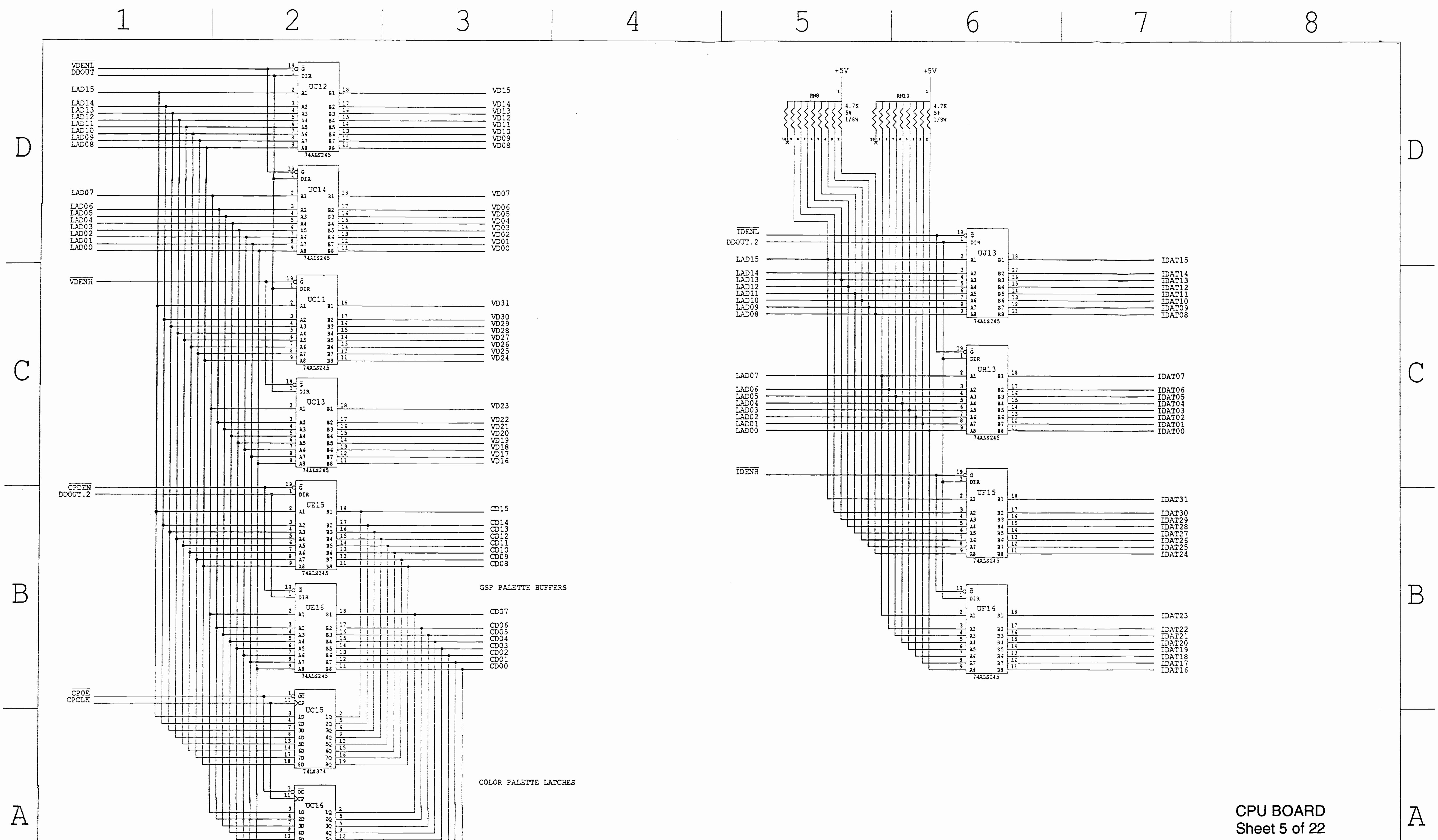
CPU BOARD
Sheet 3 of 22

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.		
PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE ADDRESS GENERATION/BUFFERS
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	
APPROVED DATE	SHEET 03 OF 22	PART NO. 16-9423 REV. -



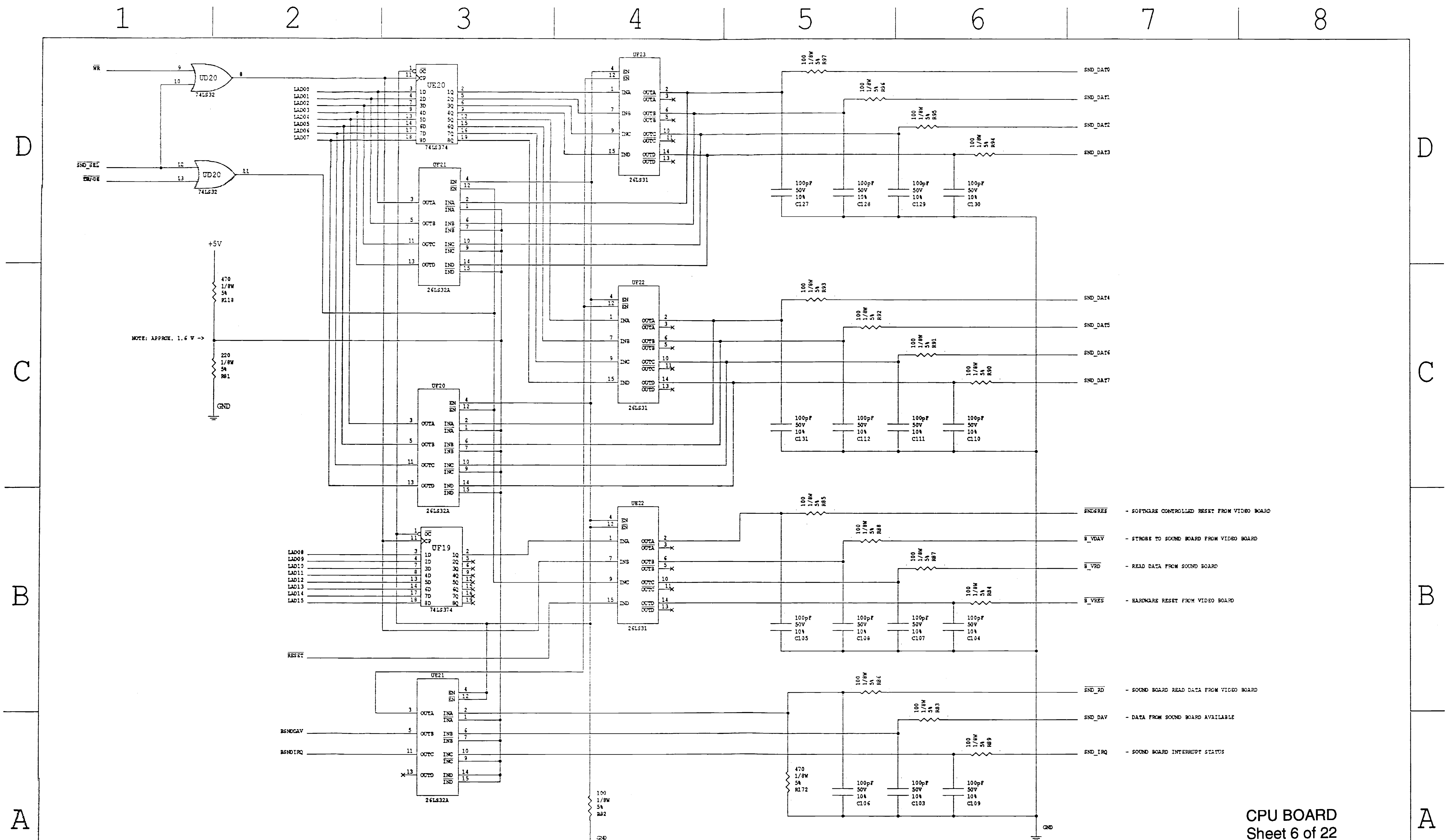
CPU BOARD
Sheet 4 of 22

PROJECT ENG. REM	FIRST PROJ. NO 40023	DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM	FIRST USEAGE A-14186	DATE 09DEC92	TITLE
CHECKED	CURRENT PROJECT 40023	DATE 09DEC92	SYSTEM MEMORY
APPROVED	SHEET 04	OF 22	PART NO. 16-9423 REV. -



CPU BOARD
Sheet 5 of 22

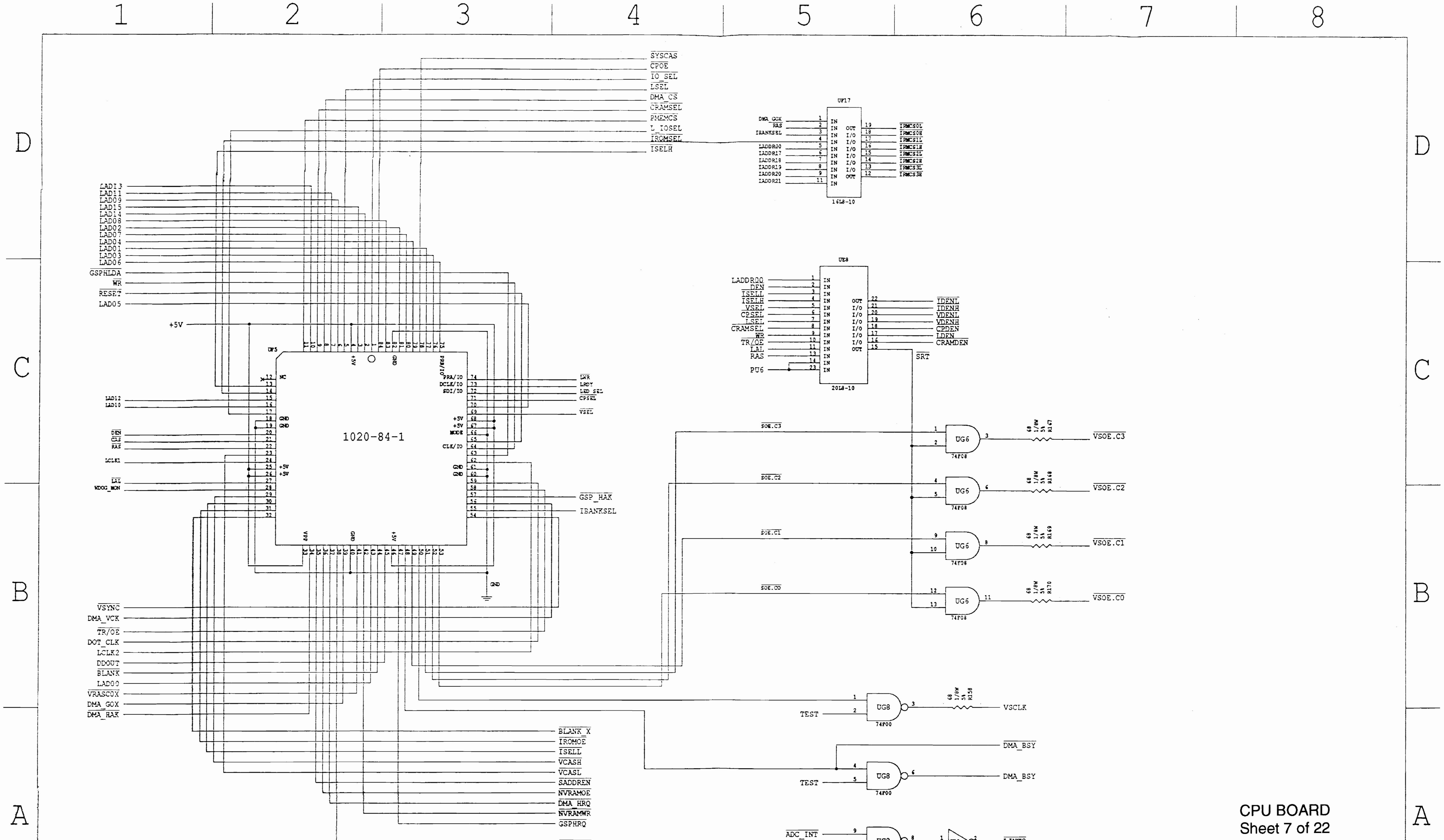
PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.	
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92		
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	TITLE IMAGE/VIDEO MEMORY DATA BUFFERS	
APPROVED DATE	SHEET 05 OF 22	PART NO. 16-9423	REV. -



CPU BOARD
Sheet 6 of 22

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

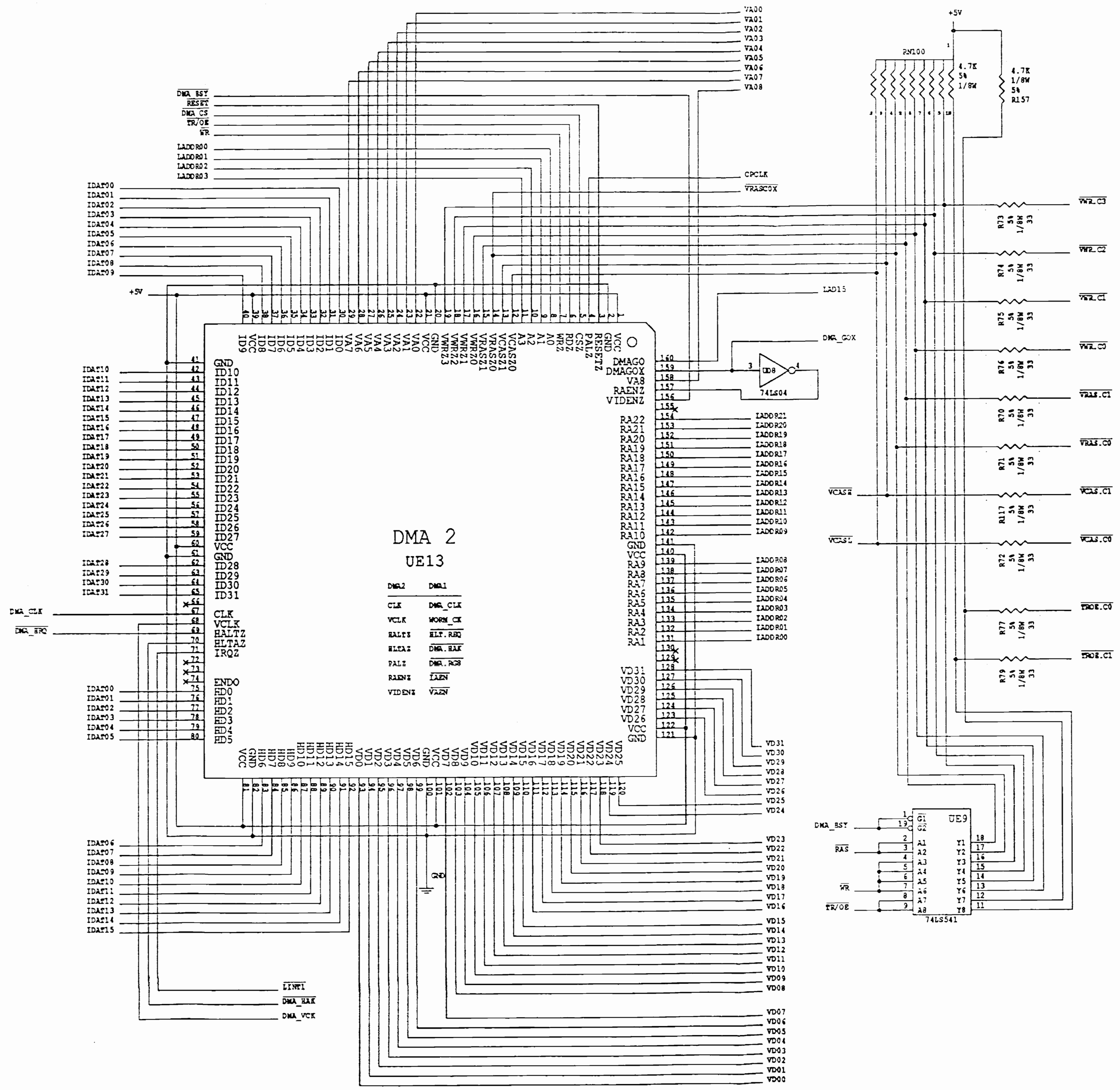
PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.	
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE SOUND INTERFACE	
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92		
APPROVED DATE	SHEET 06 OF 22	PART NO. 16-9423	REV. -



CPU BOARD
Sheet 7 of 22

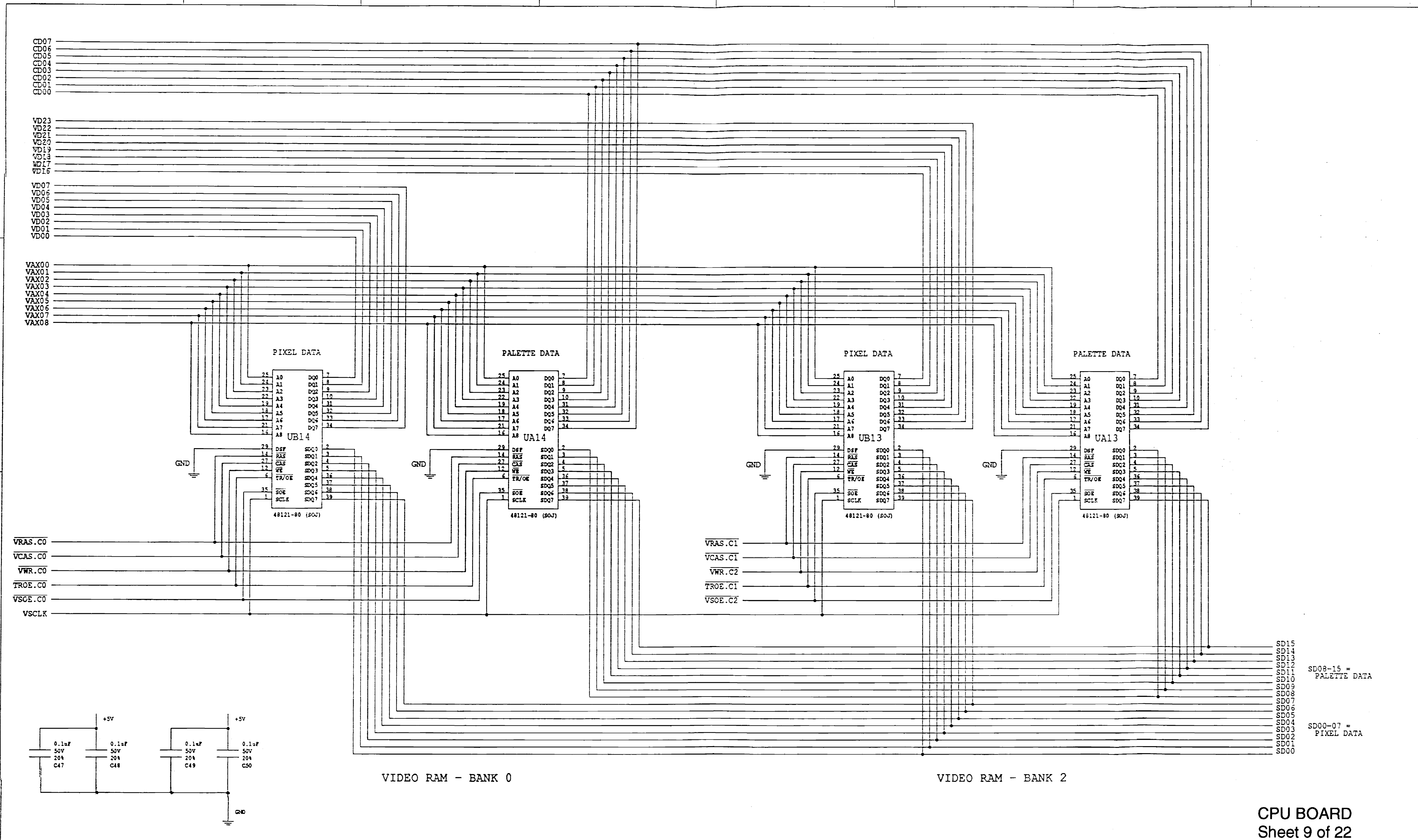
INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE FPGA
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	
APPROVED DATE	SHEET 07 OF 22	PART NO. 16-9423 REV. -



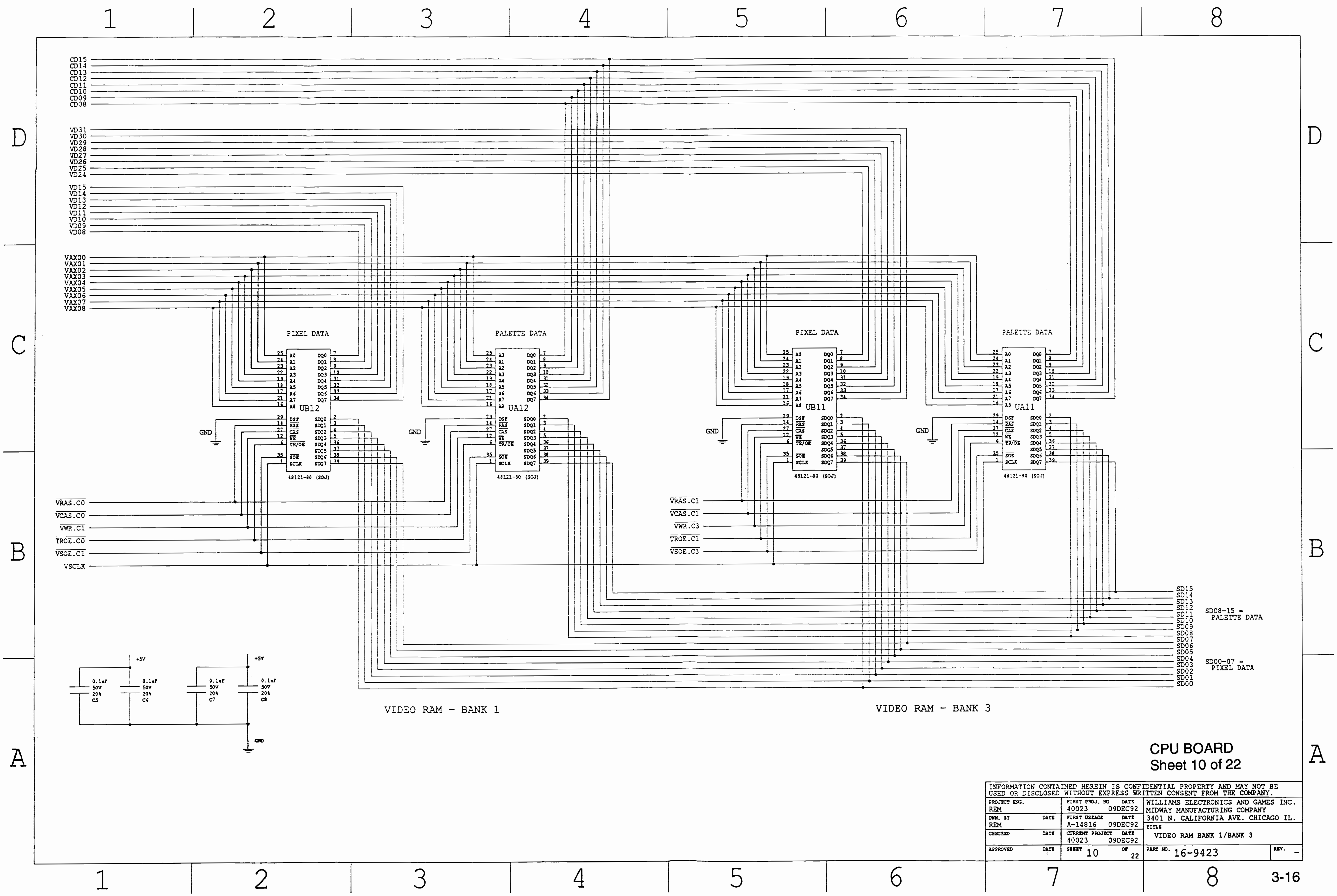
CPU BOARD
Sheet 8 of 22

PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.	
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE DMA	
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92		
APPROVED DATE	SHEET 08 OF 22	PART NO. 16-9423	REV. -



CPU BOARD
Sheet 9 of 22

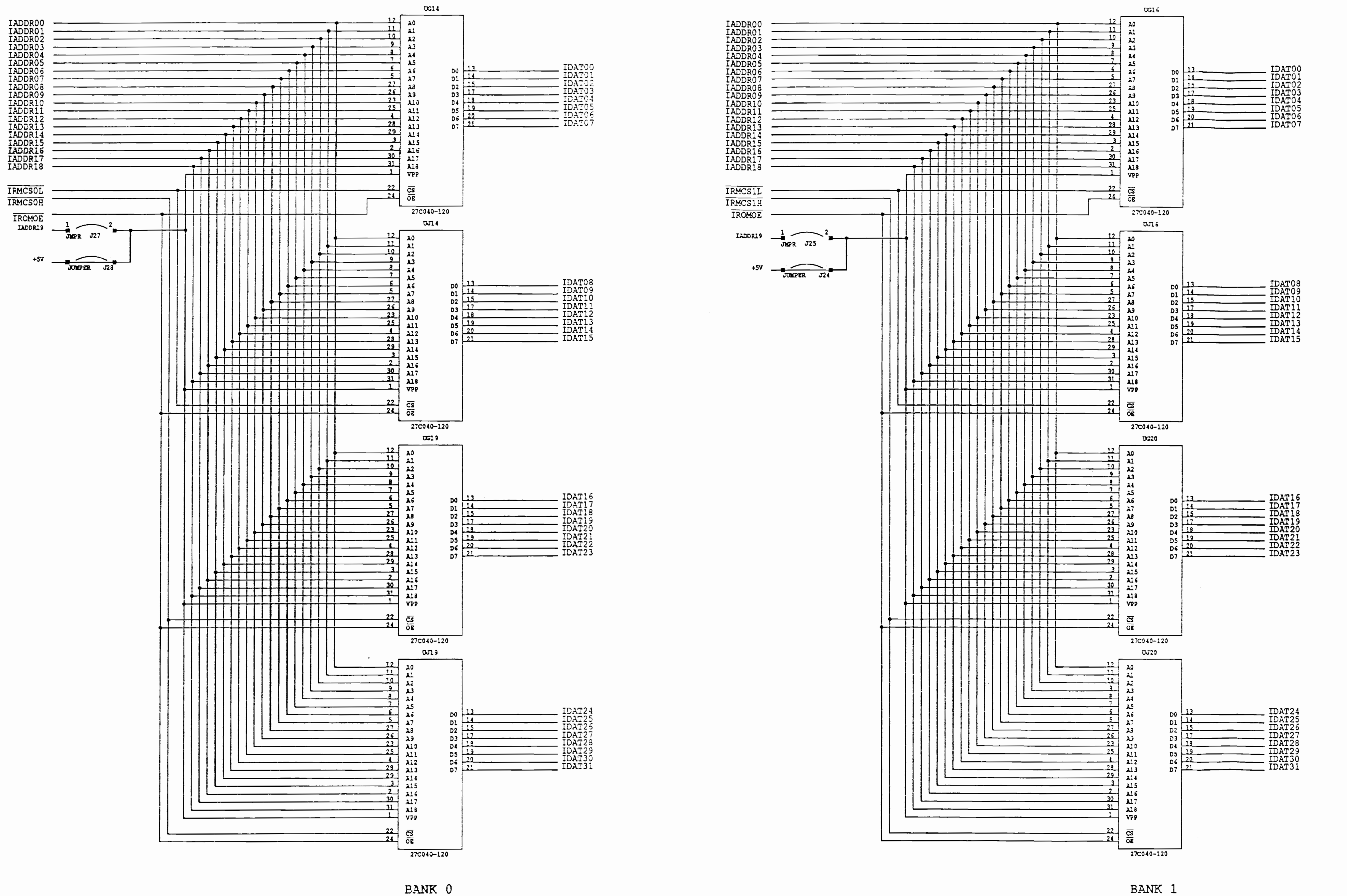
PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST CHANGE A-14816 DATE 09DEC92	TITLE VIDEO RAM BANK 0/BANK 2
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	
APPROVED DATE	SHEET 09 OF 22	PART NO. 16-9423 REV. -



CPU BOARD
Sheet 10 of 22

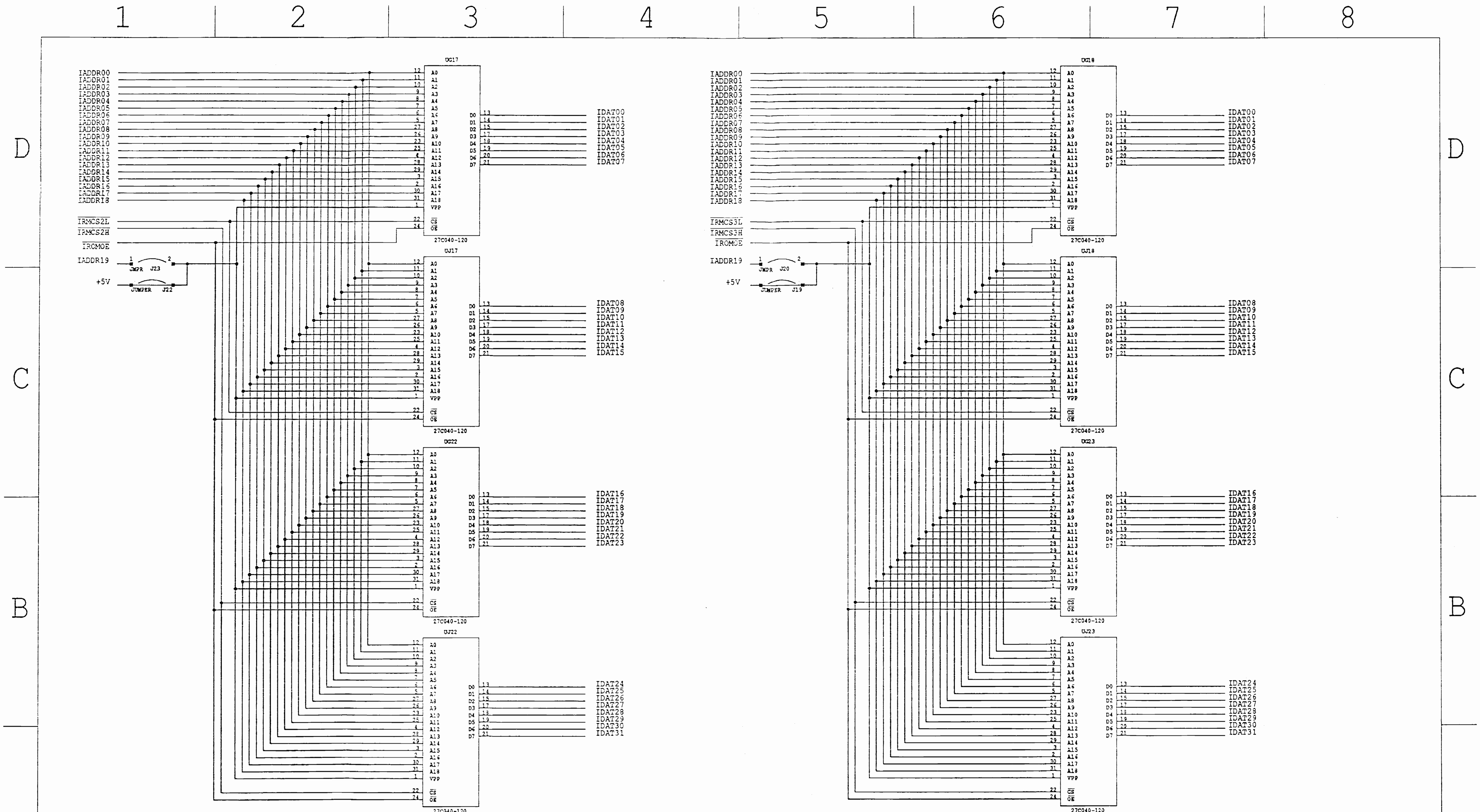
INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	3401 N. CALIFORNIA AVE. CHICAGO IL.
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	TITLE VIDEO RAM BANK 1/BANK 3
APPROVED DATE	SHEET 10 OF 22	PART NO. 16-9423 REV. -



CPU BOARD
Sheet 11 of 22

PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE IMAGE ROM BANK 0/BANK 1
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	
APPROVED DATE	SHEET 11 OF 22	PART NO. 16-9423

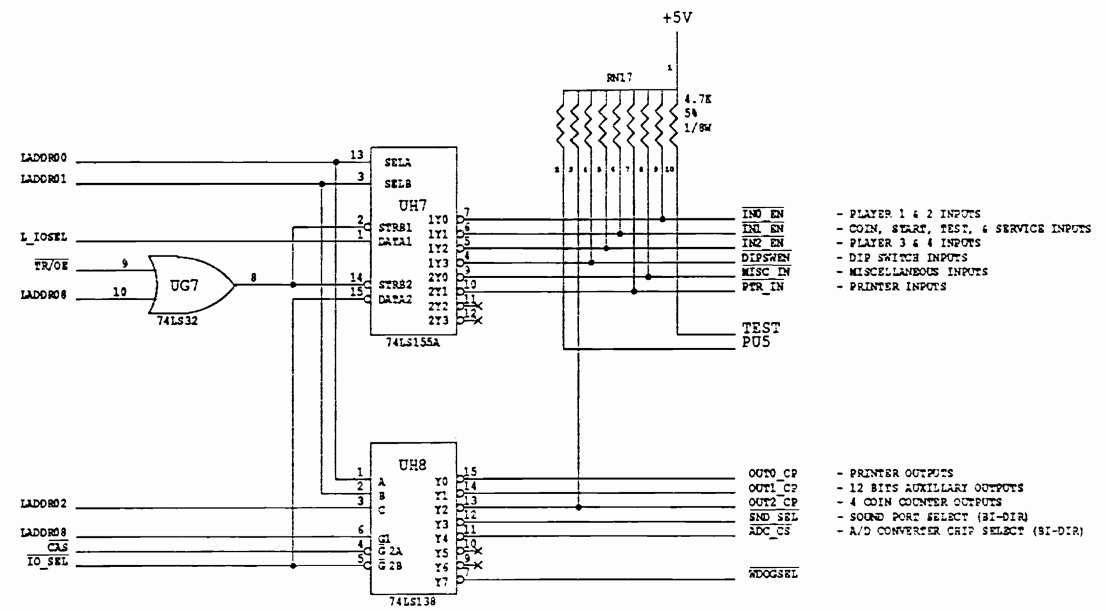


BANK 2

BANK 3

CPU BOARD
Sheet 12 of 22

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.		
PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE IMAGE ROM BANK 2/BANK 3
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	
APPROVED DATE	SHEET 12 OF 22	PART NO. 16-9423 REV. –



CPU BOARD
Sheet 13 of 22

PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE I/O DECODING
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	
APPROVED DATE	SHEET 13 OF 22	PART NO. 16-9423 REV. -

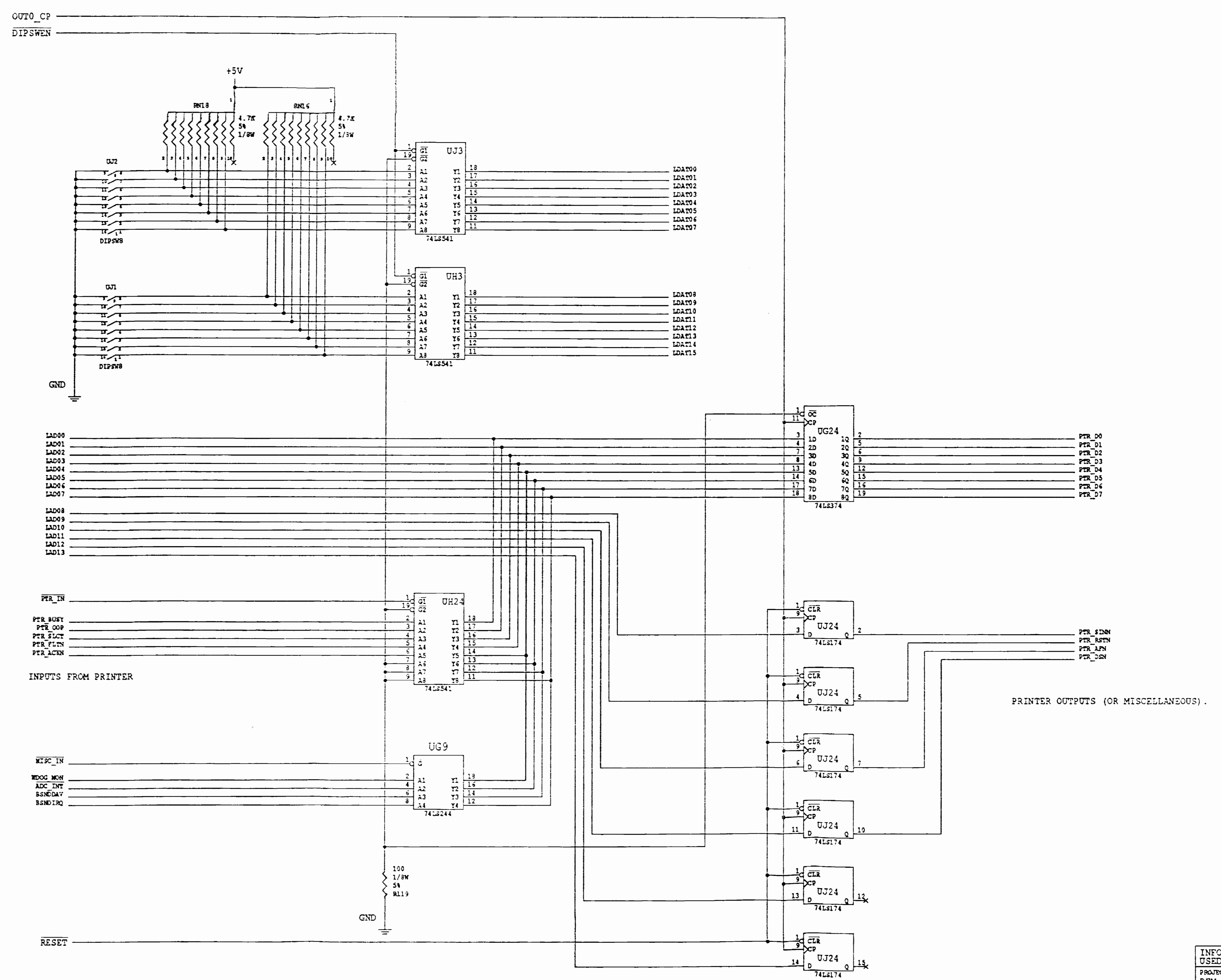
1 2 3 4 5 6 7 8

D

C

B

A

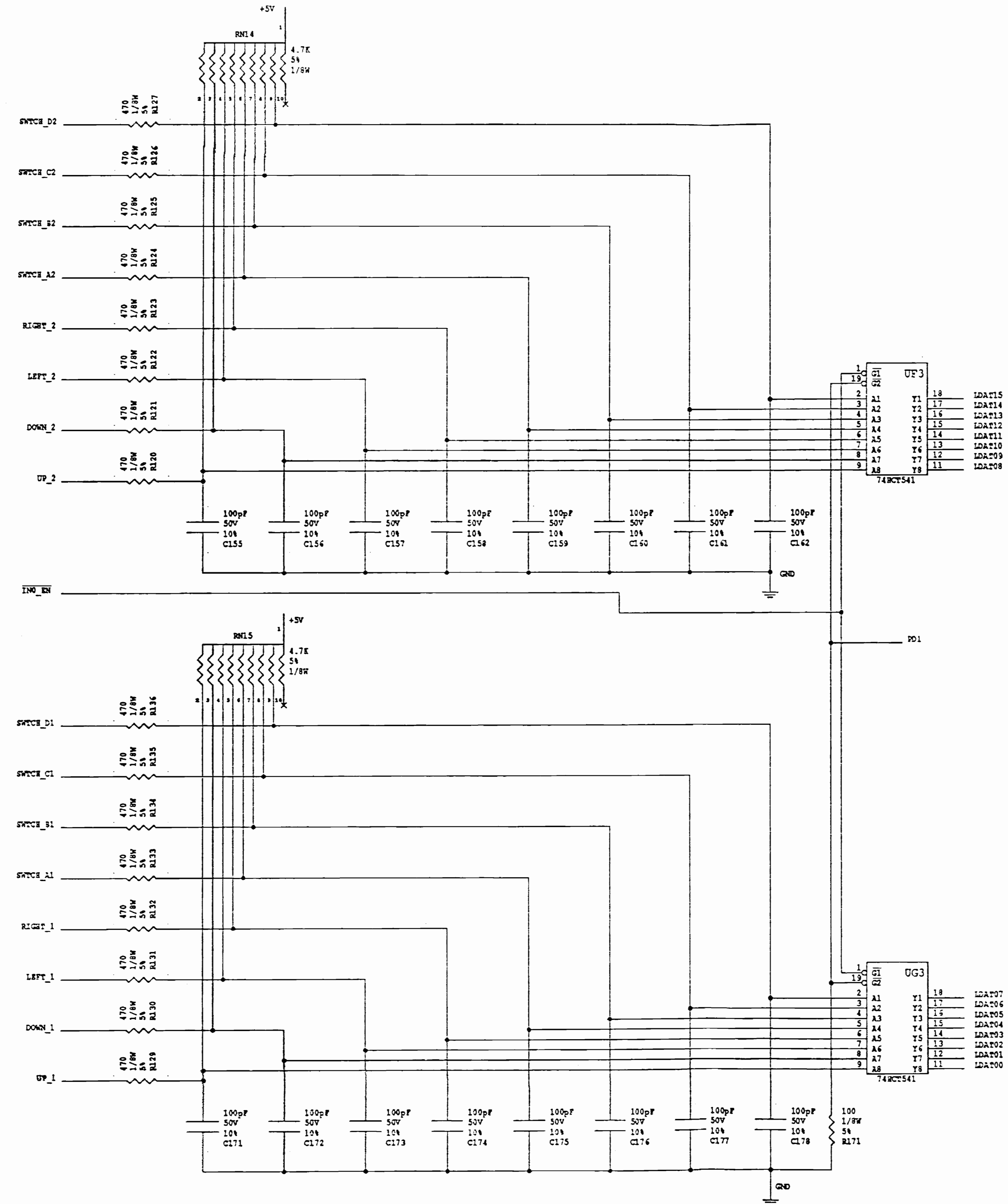


CPU BOARD
Sheet 14 of 22

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

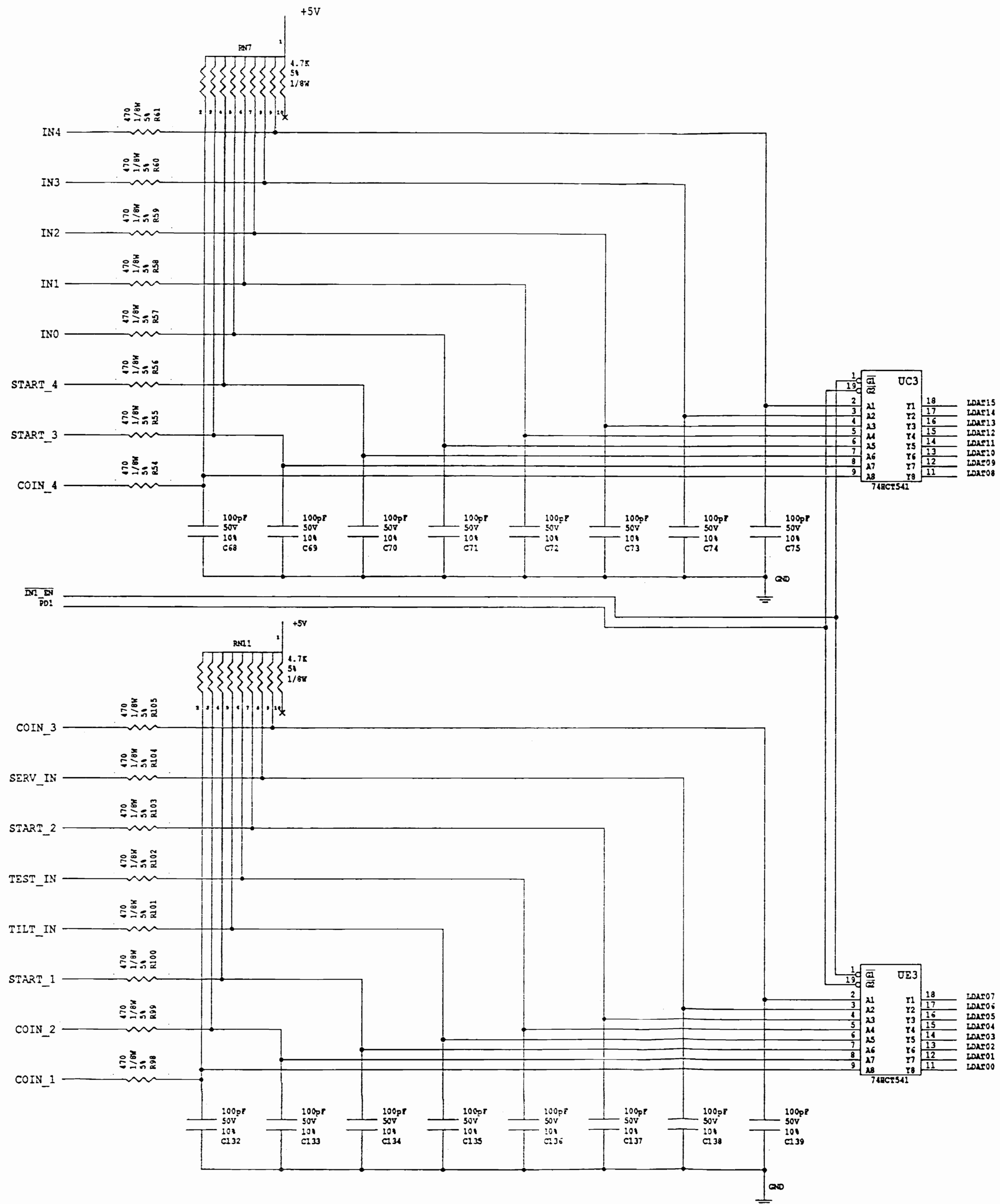
PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	MISC. I/O AND DIP SWITCH
APPROVED DATE	SHEET 14 OF 22	PART NO. 16-9423 REV. -

1 2 3 4 5 6 7 8



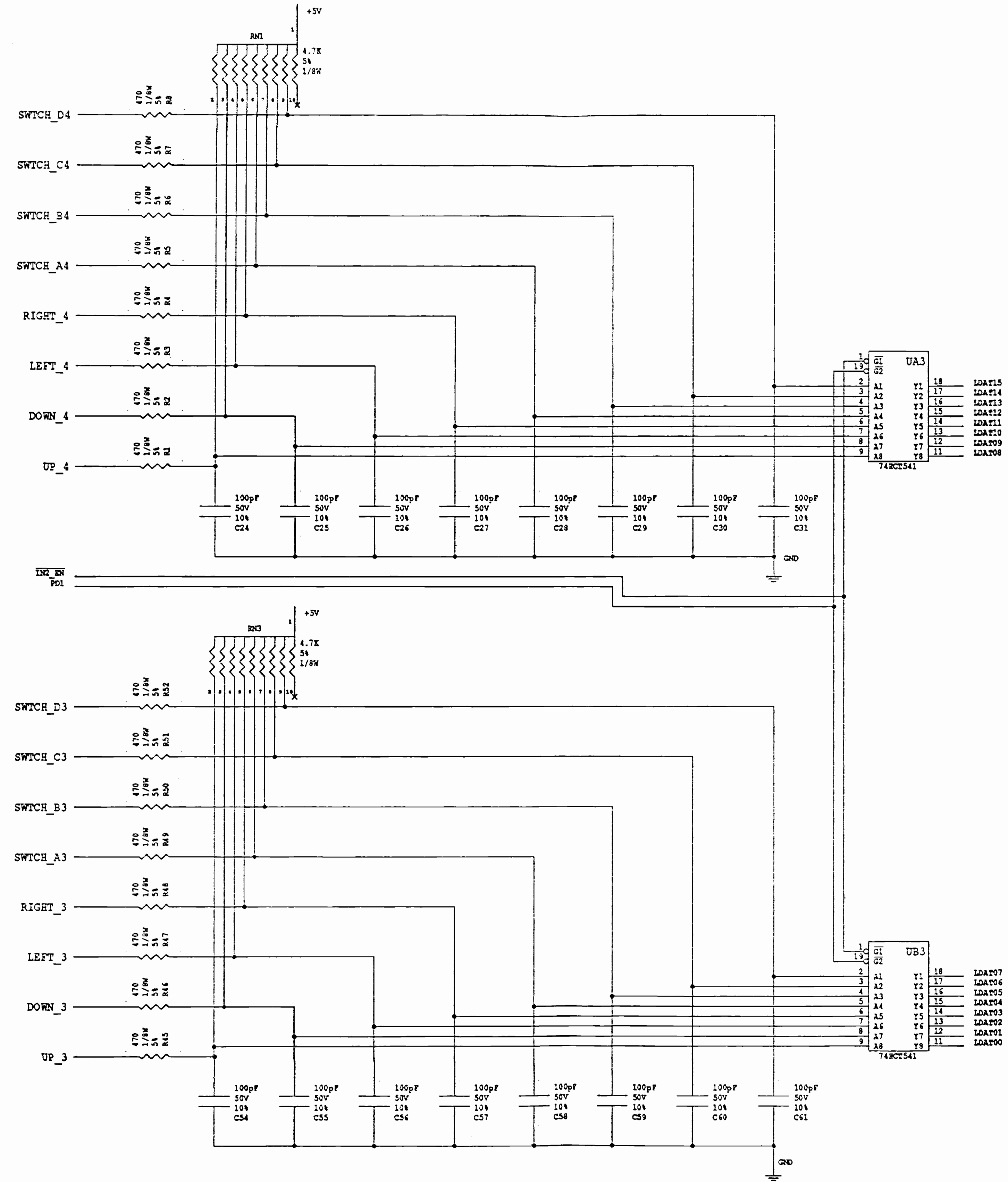
CPU BOARD
Sheet 15 of 22

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.		
PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE PLAYER 1/PLAYER 2 INPUTS
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	
APPROVED DATE	SHEET 15 OF 22	PART NO. 16-9423 REV. -



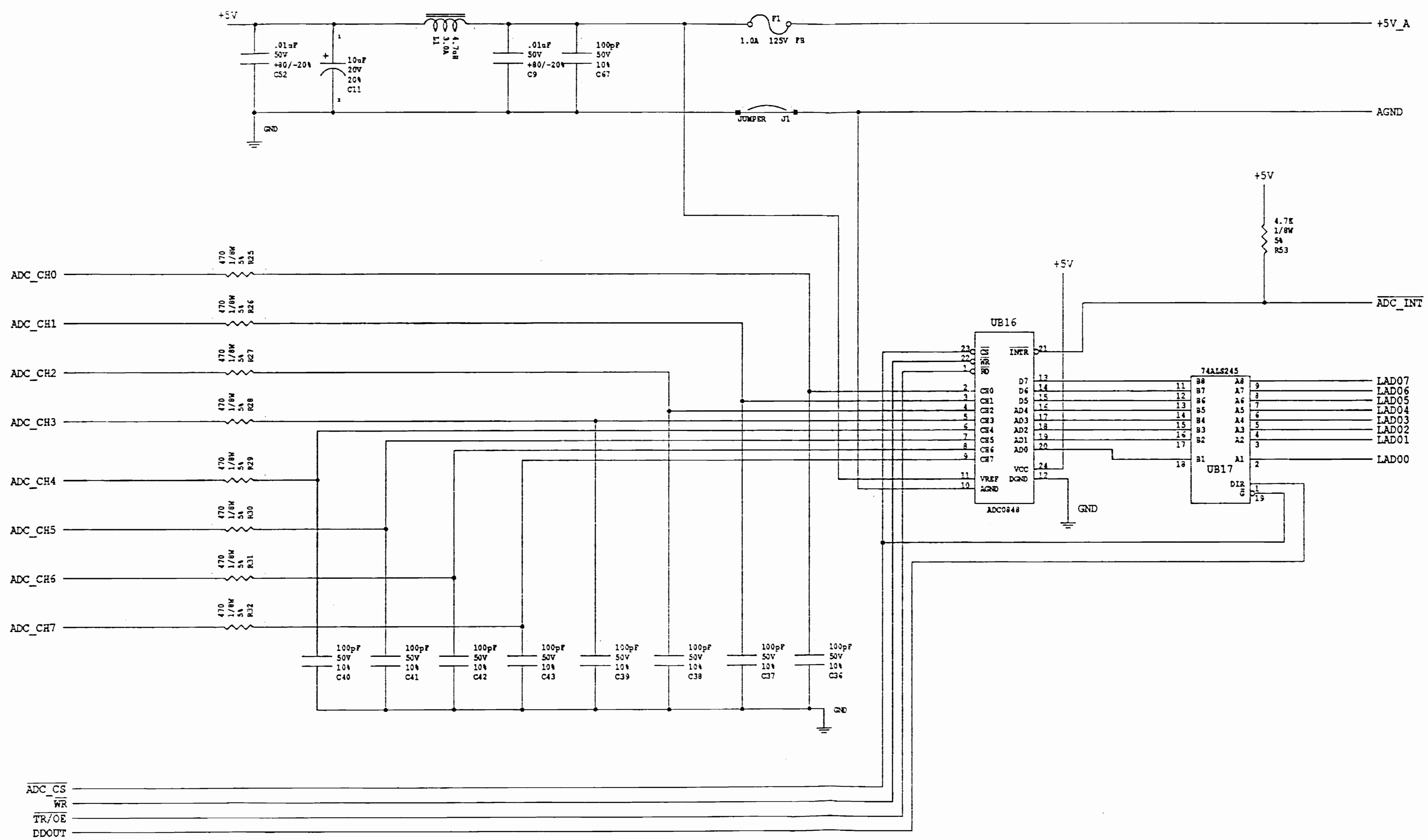
CPU BOARD
Sheet 16 of 22

PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE EXTRA INPUTS/COIN/START
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	
APPROVED DATE	SHEET 16 OF 22	PART NO. 16-9423 REV. -



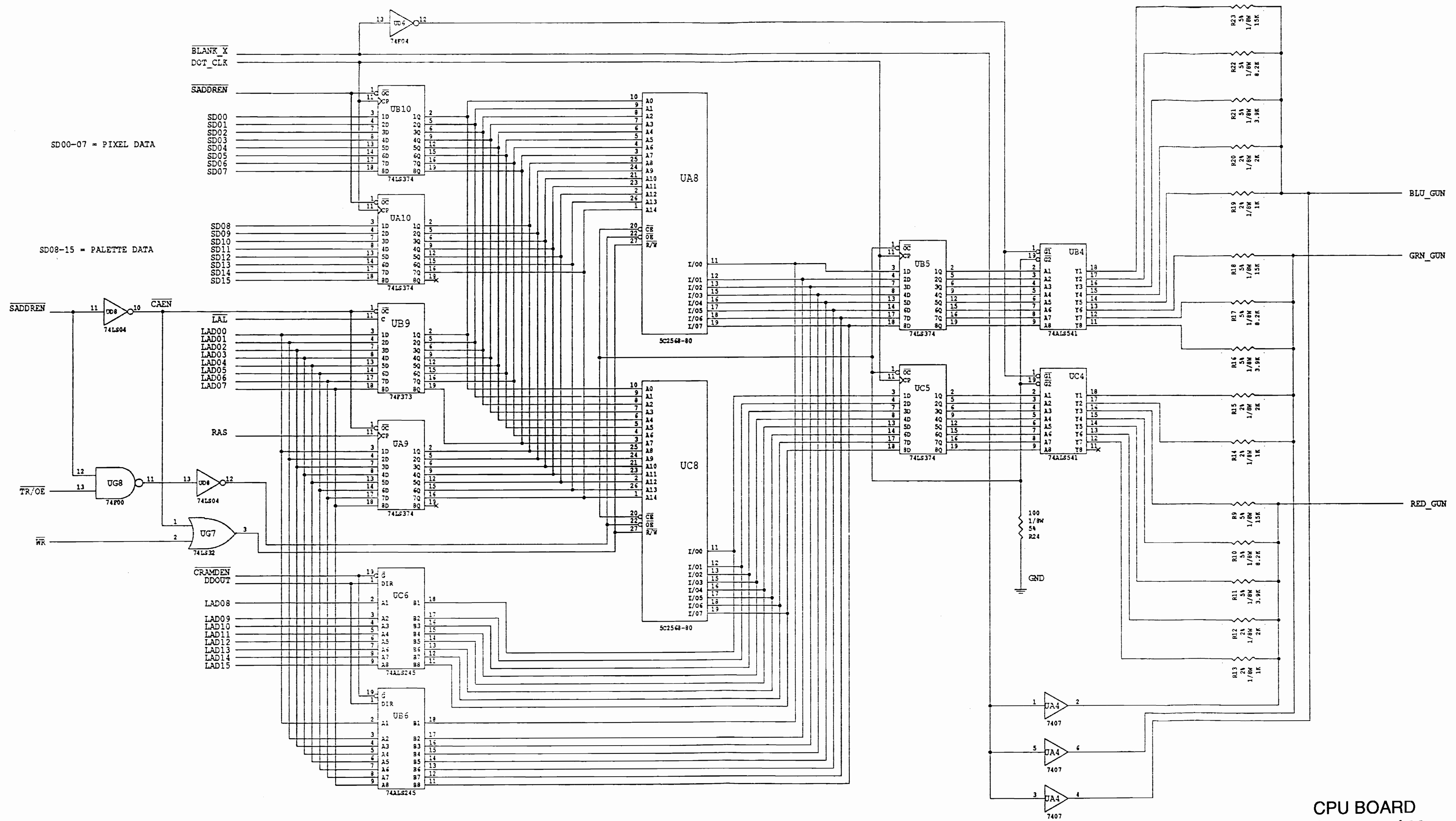
CPU BOARD
Sheet 17 of 22

PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	TITLE PLAYER 3/PLAYER 4 INPUTS
APPROVED DATE	SHEET 17 OF 22	PART NO. 16-9423 REV. -



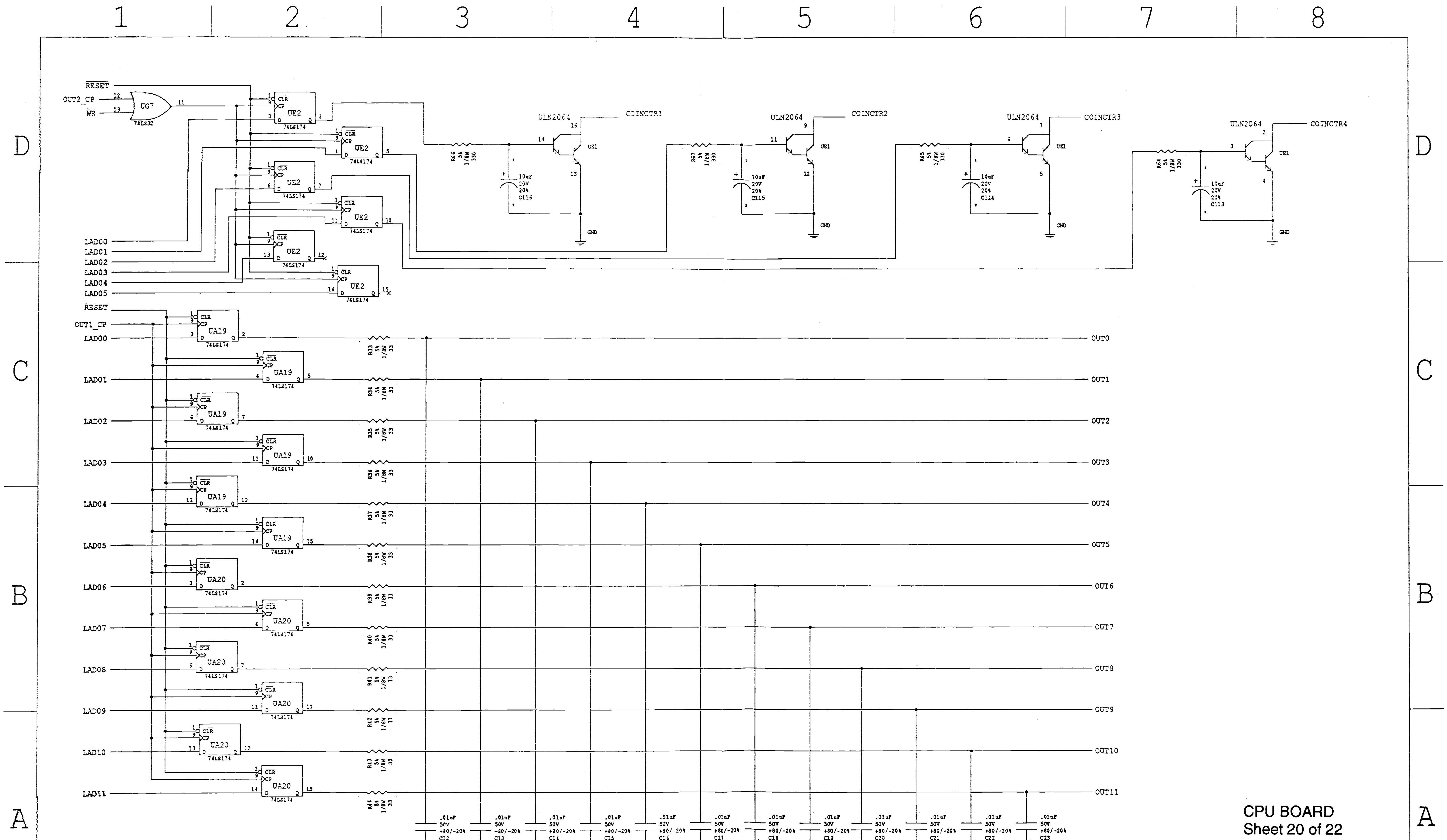
CPU BOARD
Sheet 18 of 22

PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE A/D
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	
APPROVED DATE	SHEET 18 OF 22	PART NO. 16-9423 REV. -



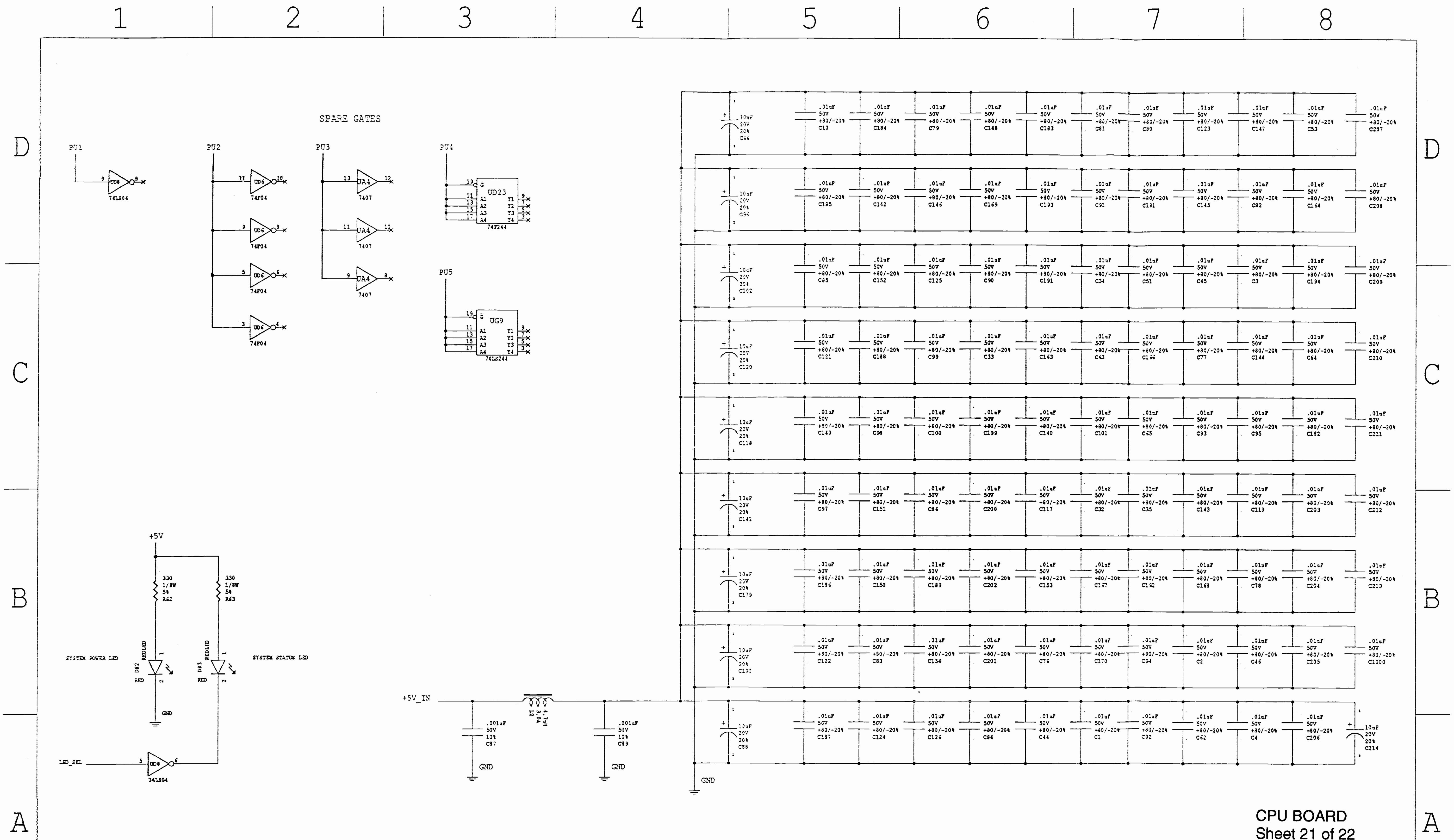
CPU BOARD
Sheet 19 of 22

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.			
PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.	
DWN. BY REM DATE	FIRST USAGE A-14816 DATE 09DEC92	TITLE RAMDAC	
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92		
APPROVED DATE	SHEET 19 OF	PART NO. 16-9423	REV. _



CPU BOARD
Sheet 20 of 22

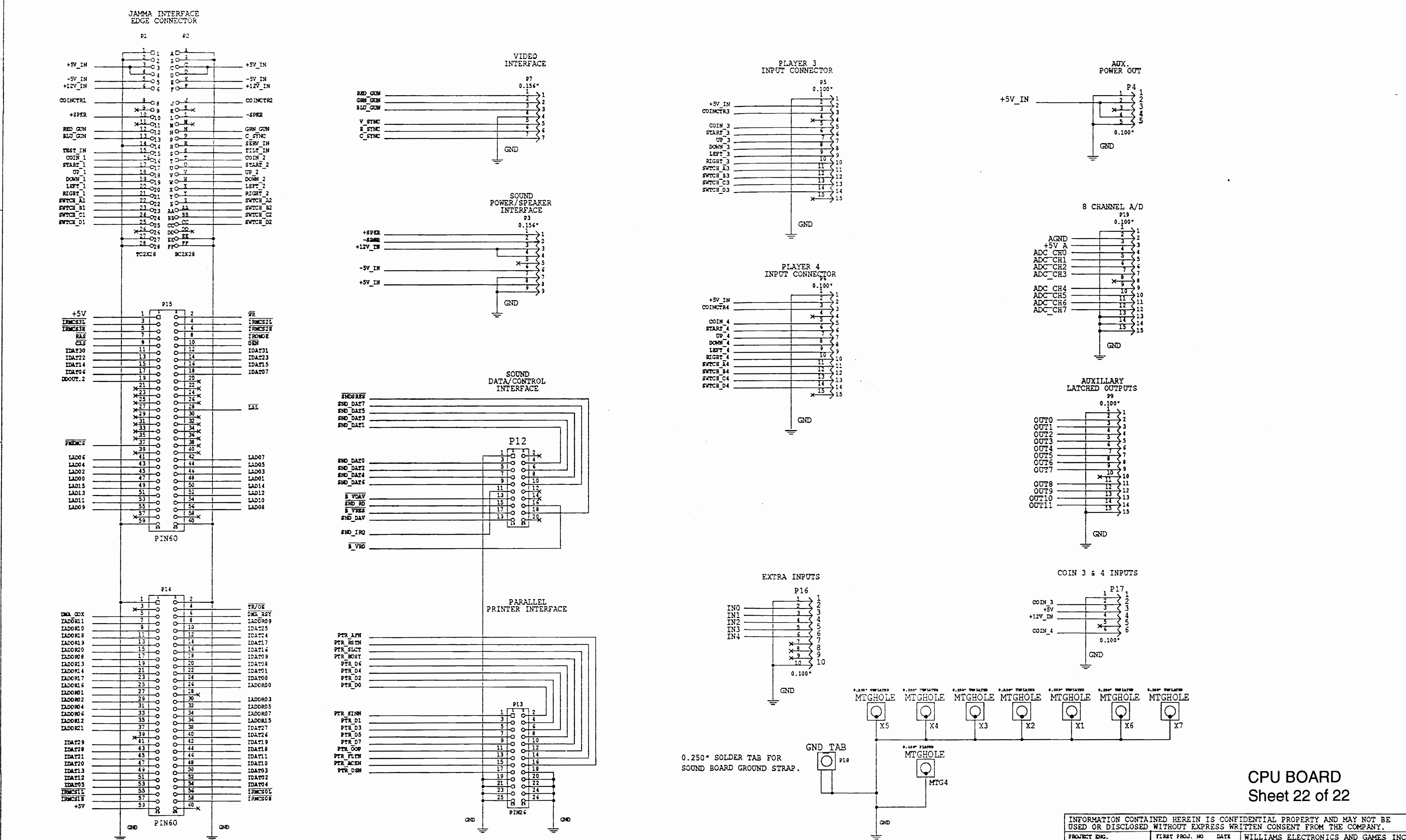
INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.		
PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE OUTPUTS
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	
APPROVED DATE	SHEET 20 OF 22	PART NO. 16-9423 REV. -



CPU BOARD
Sheet 21 of 22

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

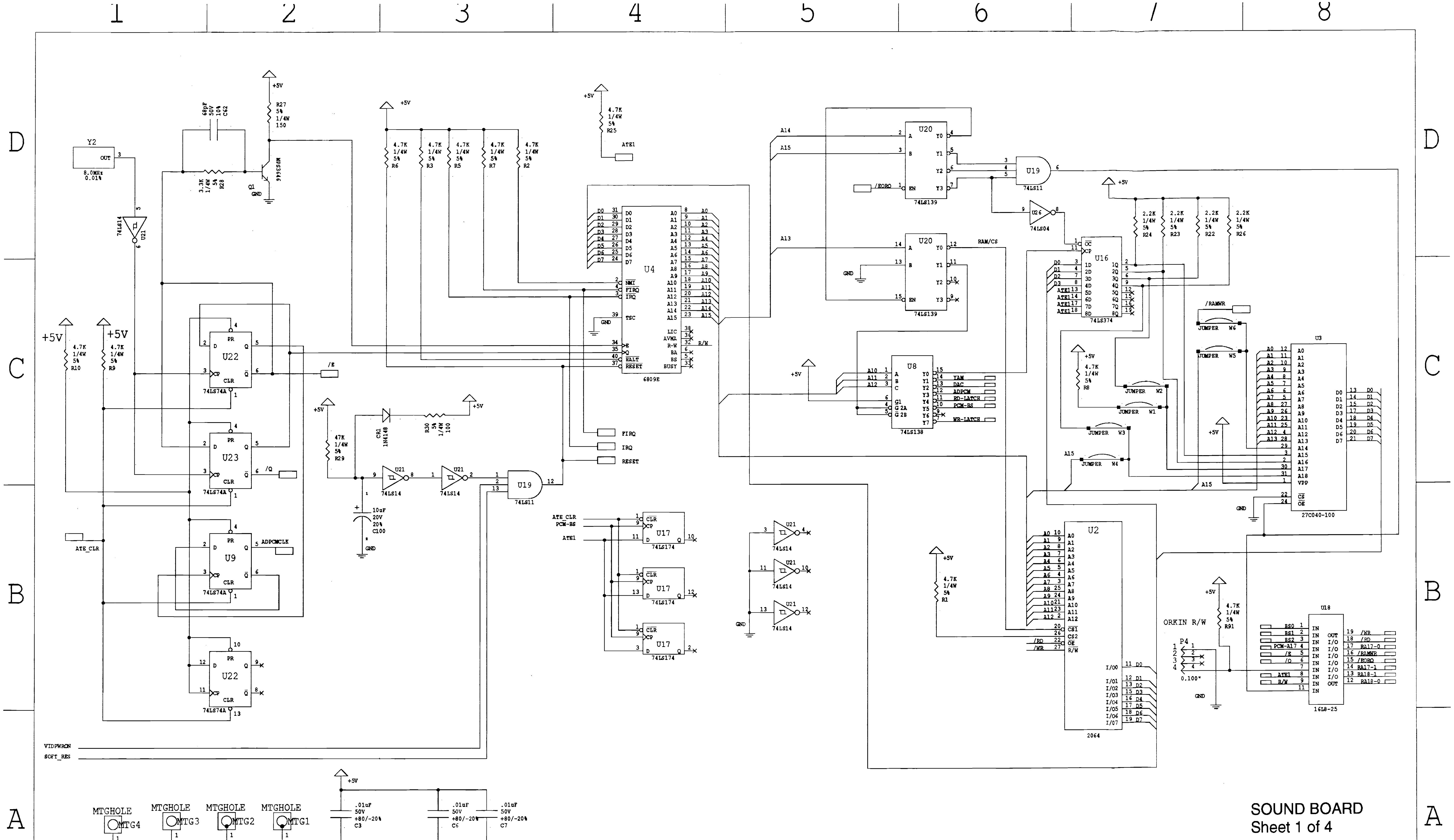
PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE POWER
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	
APPROVED DATE	SHEET 21 OF 22	PART NO. 16-9423 REV. -



CPU BOARD
Sheet 22 of 22

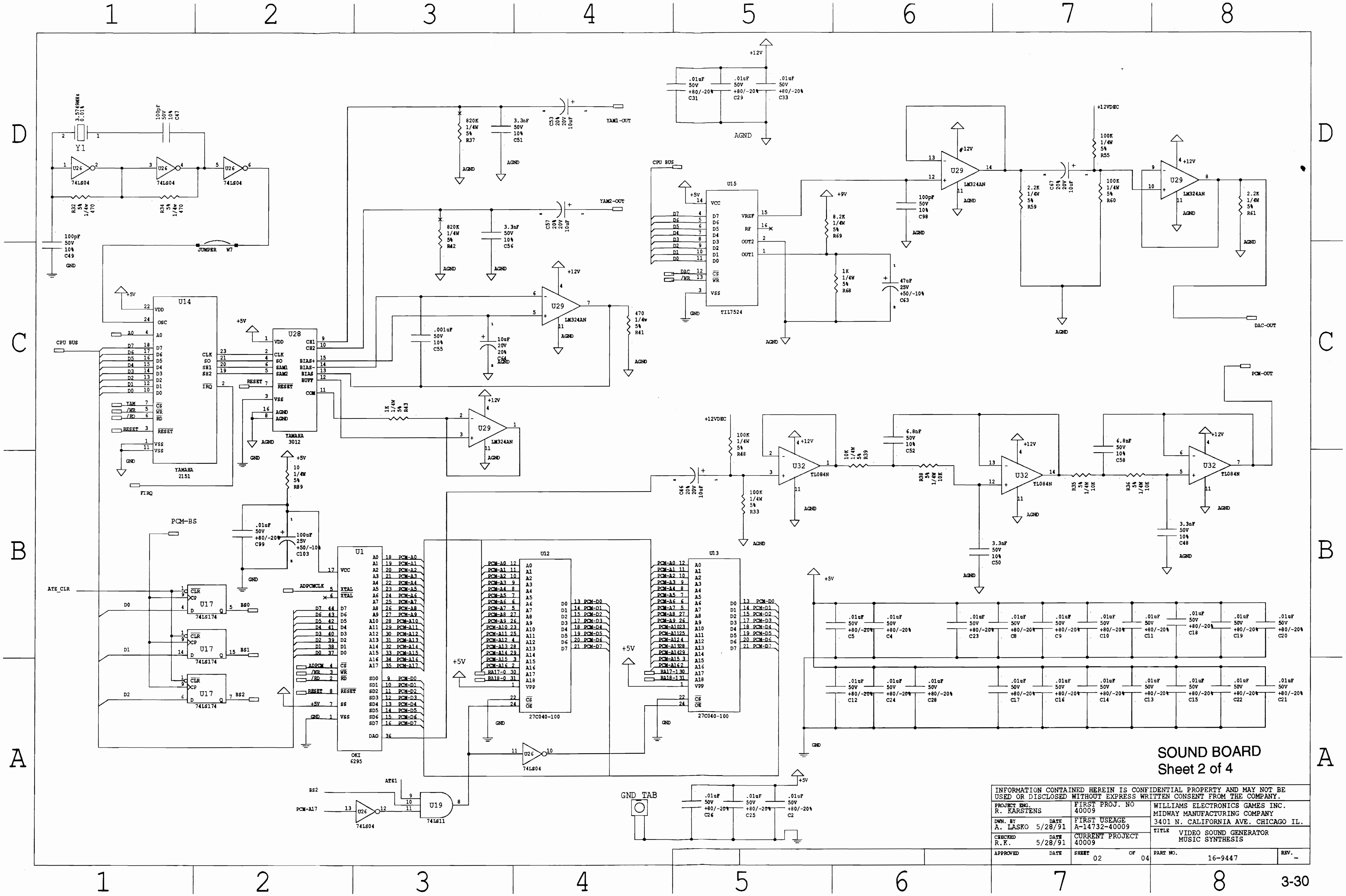
INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE CONNECTORS
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	
APPROVED DATE	SHEET 22 OF 22	PART NO. 16-9423 REV. -

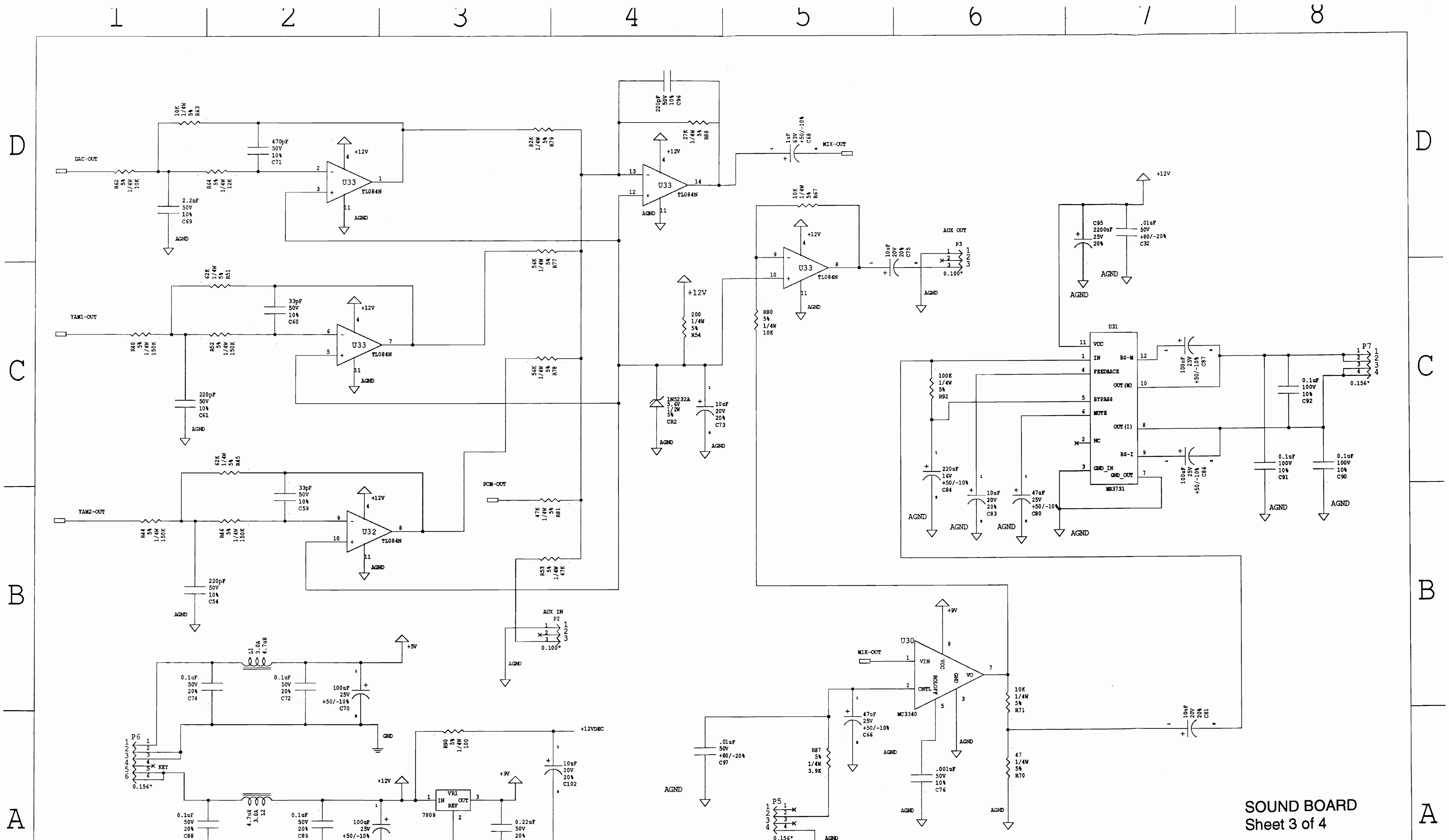


SOUND BOARD
Sheet 1 of 4

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.		
PROJECT ENG. R. KARSTENS	FIRST PROJ. NO 40023	WILLIAMS ELECTRONICS GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY A. LASKO DATE 5/28/91	FIRST USEAGE a-14732-40023	TITLE VIDEO SOUND GENERATOR SPEECH SYSTHESIS
CHECKED R.K. DATE 5/28/91	CURRENT PROJECT 40023	
APPROVED DATE	SHEET 01 OF 04	PART NO. 16-9447 REV. _

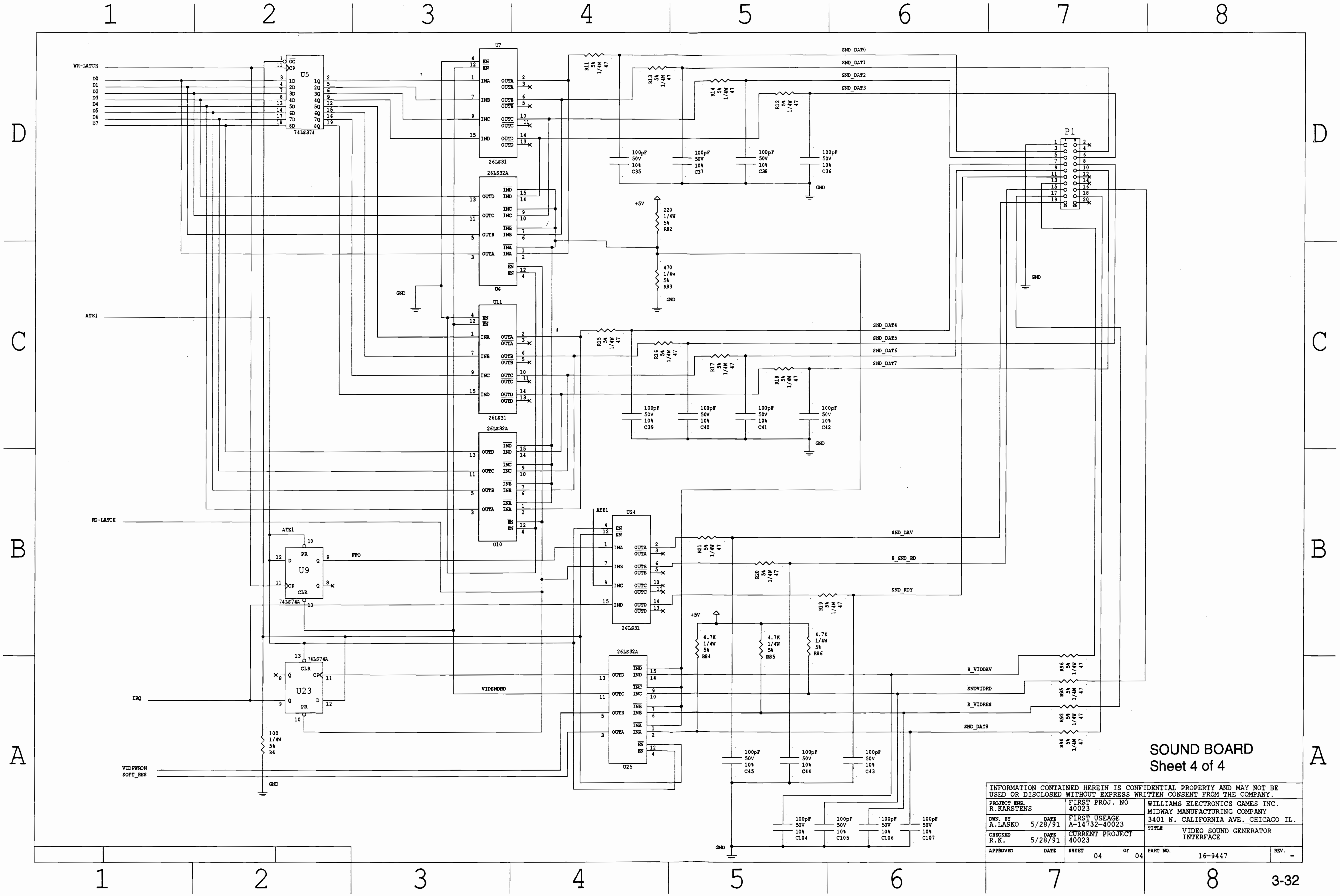


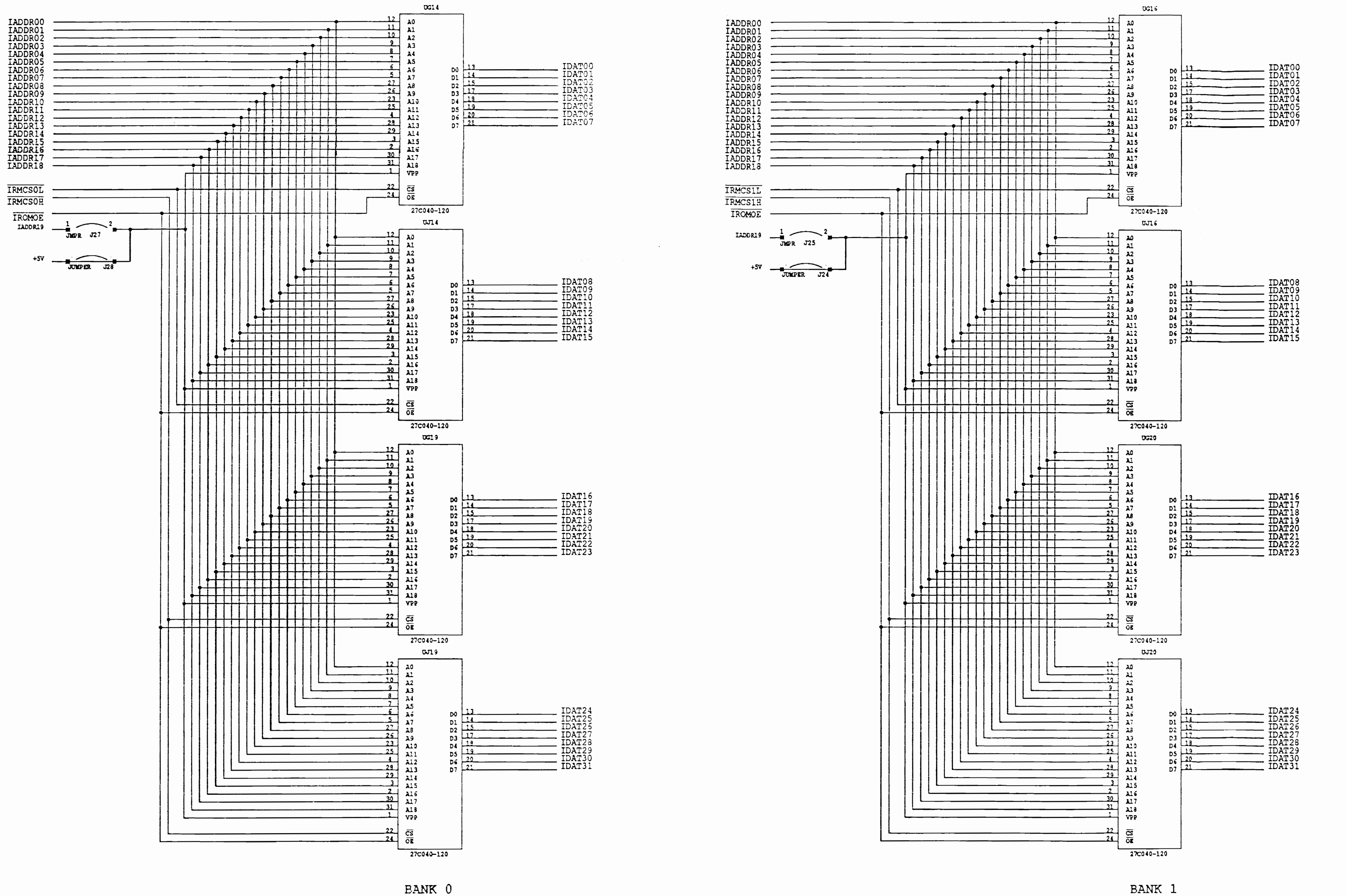
SOUND BOARD
Sheet 2 of 4
U14
YAMAHA 2151
U28
YAMAHA 3012
U29
LM324AN
U15
TII7524
U32
TL084N
U1
OKI 6295
U12
27C040-100
U13
27C040-100
U17
74LS174
U26
74LS04
U19
74LS11
Y1
3.579MHz
JUMPER W7
CPU BUS
FIRQ
PCM-BS
ATE_CLR
ADPCMCLK
YAM1-OUT
YAM2-OUT
DAC-OUT
PCM-OUT
GND_TAB
+12VDEC
AGND
GND
+5V
+12V
+9V
INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.
PROJECT ENG. R. KARSTENS
FIRST PROJ. NO 40009
WILLIAMS ELECTRONICS GAMES INC.
MIDWAY MANUFACTURING COMPANY
3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY A. LASKO
DATE 5/28/91
FIRST USEAGE A-14732-40009
CHECKED R.K.
DATE 5/28/91
CURRENT PROJECT 40009
TITLE VIDEO SOUND GENERATOR MUSIC SYNTHESIS
APPROVED
DATE
SHEET 02 OF 04
PART NO. 16-9447
REV. -



SOUND BOARD
Sheet 3 of 4

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.		
PROJECT ENG. R. KARSTENS	FIRST PROJ. NO 40023	WILLIAMS ELECTRONICS GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY A.LASKO DATE 5/28/91	FIRST USEAGE A-14732-40023	TITLE VIDEO SOUND GENERATOR AMPLIFIER
CHECKED R.K. DATE 5/28/91	CURRENT PROJECT 40023	
APPROVED DATE	SHEET 03 OF 04	PART NO. 16-9447 REV. -


WR-LATCH
D0
D1
D2
D3
D4
D5
D6
D7
U5
74LS374
U7
26LS31
26LS32A
U6
U11
26LS31
26LS32A
U10
ATE1
RD-LATCH
U9
74LS74A
FFO
U23
IRQ
VIDPWRON
SOFT_RES
U24
26LS31
26LS32A
U25
VIDSNDRD
SND_DAT0
SND_DAT1
SND_DAT2
SND_DAT3
SND_DAT4
SND_DAT5
SND_DAT6
SND_DAT7
SND_DAV
B_SND_RD
SND_RDY
B_VIDDAV
SNDVIDRD
B_VIDRES
SND_DAT8
P1
+5V
GND
SOUND BOARD
Sheet 4 of 4
INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.
PROJECT ENG. R.KARSTENS
FIRST PROJ. NO 40023
WILLIAMS ELECTRONICS GAMES INC.
MIDWAY MANUFACTURING COMPANY
3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY A.LASKO DATE 5/28/91
FIRST USEAGE A-14732-40023
TITLE VIDEO SOUND GENERATOR INTERFACE
CHECKED R.K. DATE 5/28/91
CURRENT PROJECT 40023
APPROVED DATE
SHEET 04 OF 04
PART NO. 16-9447
REV. -



CPU BOARD
Sheet 11 of 22

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. REM	FIRST PROJ. NO 40023 DATE 09DEC92	WILLIAMS ELECTRONICS AND GAMES INC. MIDWAY MANUFACTURING COMPANY 3401 N. CALIFORNIA AVE. CHICAGO IL.
DWN. BY REM DATE	FIRST USEAGE A-14816 DATE 09DEC92	TITLE IMAGE ROM BANK 0/BANK 1
CHECKED DATE	CURRENT PROJECT 40023 DATE 09DEC92	
APPROVED DATE	SHEET 11 OF 22	PART NO. 16-9423 REV. -

Jumper Charts

SOUND BOARD
W2, W3, W5, W7, W8

CPU BOARD

Designator:	Value
J18, J19, J22, J24, J28	0 ohm (jumper)
R154	0 ohm (jumper)
J100, J101	47 ohm
R156	68 ohm
R165	39 ohm

WARNINGS & NOTICES

Warning
USE OF NON-MIDWAY PARTS OR CIRCUIT MODIFICATIONS MAY CAUSE SERIOUS INJURY OR EQUIPMENT DAMAGE! USE ONLY MIDWAY AUTHORIZED PARTS.
* For safety and reliability, substitute parts and modifications are not recommended.
* Substitute parts or modifications may void FCC type acceptance.
* This game is protected by Federal Copyright, trademark and patent laws. Unauthorized modifications may be illegal under Federal law. This also applies to MIDWAY logos, designs, publications and assemblies. Moreover, facsimiles of MIDWAY equipment (or any feature thereof) may be illegal under federal law, regardless of whether or not such facsimiles are manufactured with MIDWAY components.

Warning
This equipment generates, uses and can emit radio frequency energy and, if not installed properly and used according to the directions in this manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of part 15 of FCC rules which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference to radio communications, in which the user, at his or her own expense, will be required to take whatever measures may be needed to correct the interference.

Warning
Prevent shock hazard and assure proper game operation. Only plug this game into a properly grounded outlet. Do not use a cheater plug to defeat the power cord's grounding pin. Do not cut off the ground pin.

Notice
When MIDWAY ships a game, it is in compliance with FCC regulations. Your sticker is proof. If the sticker is missing or damaged, legal repercussions to the owner or distributor of the game may result. If your game does not contain an FCC sticker, call MIDWAY immediately.

Notice
No part of this publication may be reproduced by any mechanical , photographic, or electronic process, or in the form of a phonographic recording, nor may be transmitted, or otherwise copied for public or private use, without permission from the publisher.

For Service: Call your Authorized MIDWAY Distributor.

MIDWAY MANUFACTURING COMPANY
3401 N. CALIFORNIA AVE.
CHICAGO, ILLINOIS 60618